PB87-227310

Development of Chemical Compatibility Criteria for Assessing Flexible Membrane Liners

National Sanitation Foundation, Ann Arbor, MI

Prepared for

Environmental Protection Agency, Cincinnati, OH

Aug 87

U.S. Department of Commerce
National Technical Information Service
NTIS

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO.
EPA/600/2-87/067

2.

3. RECIPIENT'S ACCESSION NO.
PB87 227310/AS

4. TITLE AND SUBTITLE
Development of Chemical Compatibility Criteria for Assessing Flexible Membrane Liners

5. REPORT DATE
August 1987

6. PERFORMING ORGANIZATION CODE

7. AUTHOR(S)
Gordon Bellen, Rebecca Corry and Mae Lynn Thomas.

8. PERFORMING ORGANIZATION REPORT NO.

9. PERFORMING ORGANIZATION NAME AND ADDRESS
National Sanitation Foundation
P.O. Box 1468
Ann Arbor, MI 48106

10. PROGRAM ELEMENT NO.

11. CONTRACT/GRANT NO.
CR 810727

12. SPONSORING AGENCY NAME AND ADDRESS
Hazardous Waste Engineering Research Laboratory
Office of Research and Development
U.S. Environmental Protection Agency
Cincinnati, Ohio 45268

13. TYPE OF REPORT AND PERIOD COVERED

14. SPONSORING AGENCY CODE
EPA/600/12

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Laboratory testing was conducted to develop chemical resistance data using immersion tests. Six FML materials (polyvinylchloride, chlorinated polyethylene, chlorosulfonated polyethylene, high density polyethylene, epichlorohydrin and ethylene propylene diene terpolymer) were tested. Twenty chemical solutions providing a range of chemical challengers; acid and base, polar and non-polar, organic and inorganic, and increasing chemical concentration, were used. Duration of immersions were 1, 7, 14, 28, and 56 days, and four month increments for up to two years. All immersion tests were conducted at two temperatures, 23° and 50°C. Liners were evaluated for changes in appearance, weight, dimensions, and tensile properties. Procedures and criteria for evaluating immersion test results were developed using data from this study and comparing these data with comparable data from other studies, published reports and criteria, and liner manufacturer recommendations. The criteria for chemical resistance include the need for a liner response to have stabilized, retention of minimum physical properties, and maximum percent change of physical properties. A mathematical curve fitting method is proposed for evaluating immersion data as a function of time. The method assumes the liner approaches a limit of physical property change (stability) asymptotically. The method can be used to predict the ultimate end point of physical property change and sampling time intervals for continued immersion testing.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

18. DISTRIBUTION STATEMENT
Release to Public

19. SECURITY CLASS *(This Report)*
Unclassified

20. SECURITY CLASS *(This page)*
Unclassified

21. NO. OF PAGES
511

22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

EPA/600/2-87/067
August 1987

PB87-227310

DEVELOPMENT OF CHEMICAL COMPATIBILITY CRITERIA FOR ASSESSING FLEXIBLE MEMBRANE LINERS

by

Gordon Bellen, Rebecca Corry, Mae Lynn Thomas
National Sanitation Foundation
PO Box 1468
Ann Arbor, MI 48106

Contract No. CR-810727

Project Officer

Mary Ann Curran
Land Pollution Control Division
Hazardous Waste Engineering Research Laboratory
Cincinnati, Ohio 45268

HAZARDOUS WASTE ENGINEERING RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA. 22161

NOTICE

The information in this document has been funded wholly or in part by the United States Environmental Protection Agency under Cooperative Agreement No. CR-810727 to the National Sanitation Foundation. It has been subject to the Agency's peer and administrative review, and it has been approved for publication as an EPA document. Approval does not signify that the contents necessarily reflect the views and policies of the U.S. Environmental Protection Agency nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

FOREWORD

Today's rapidly developing and changing technologies and industrial products and practices frequently carry with them the increased generation of solid and hazardous waste. These materials, if improperly dealt with, can threaten both public health and the environment. Abandoned waste sites and accidental releases of toxic and hazardous substances to the environment also have important environmental and public health implications. The Hazardous Waste Engineering Research Laboratory assists in providing an authoritative and defensible engineering basis for assessing and solving these problems. Its products support the policies, programs, and regulations of the EPA; the permitting and other responsibilities of State and local governments; and the needs of both large and small businesses in handling their wastes responsibly and economically.

Flexible membrane liners (FMLs) are used as lining materials for hazardous waste containment, in landfills and surface impoundments. A double-liner system, including at least one synthetic liner, is required in all new installations. The FML used in a waste containment application must show long-term chemical resistance to the waste stream. The EPA requires that FML selection be based on evaluation of changes in physical properties resulting from the immersion in the actual waste to be contained.

This report discusses results of immersion tests of six liner materials in twenty chemical solutions at two temperatures. Procedures and criteria for evaluating immersion results are presented.

For further information, please contact the Land Pollution Control Division of the Hazardous Waste Engineering Research Laboratory.

Thomas R. Hauser, Director
Hazardous Waste Engineering Research Laboratory

ABSTRACT

Laboratory testing was conducted to develop chemical resistance data using immersion tests. Six FML materials, polyvinylchloride, chlorinated polyethylene, chlorosulfonated polyethylene, high density polyethylene, epichlorohydrin and ethylene propylene diene terpolymer were tested. Twenty chemical solutions providing a range of chemical challengers; acid and base, polar and non-polar, organic and inorganic, and increasing chemical concentration, were used. Duration of immersions were 1, 7, 14, 28, and 56 days, and four month increments for up to two years. All immersion tests were conducted at two temperatures, 23° and 50°C. Liners were evaluated for changes in appearance, weight, dimensions, and tensile properties.

Procedures and criteria for evaluating immersion test results were developed using data from this study and comparing these data with comparable data from other studies, published reports and criteria, and liner manufacturer recommendations. The criteria for chemical resistance include the need for a liner response to have stabilized, retention of minimum physical properties, and maximum percent change of physical properties.

A mathematical curve fitting method is proposed for evaluating immersion data as a function of time. The method assumes the liner approaches a limit of physical property change (stability) asymptotically. The method can be used to predict the ultimate end point of physical property change and sampling time intervals for continued immersion testing.

This report was submitted in fulfillment of Cooperative Agreement No. CR-810727 by the National Sanitation Foundation under the sponsorship of the U.S. Environmental Protection Agency. This report covers the period July 1983 to April 1986.

CONTENTS

PAGE

FOREWORD . . . iii
ABSTRACT . . . iv
CONTENTS . . . v
FIGURES . . . viii
TABLES . . . xiii
ACKNOWLEDGMENTS . . . xv
ABBREVIATION AND SYMBOLS . . . xvi
ENGLISH TO METRIC CONVERSION TABLE . . . xvii
1. INTRODUCTION . . . 1
2. CONCLUSION AND RECOMMENDATIONS . . . 4
3. METHODS OF PREDICTING CHEMICAL RESISTANCE OF POLYMERS . . . 7
  BASIC PRINCIPLES OF POLYMER INTERACTION IN SOLVENTS . . . 7
    Polymer Types . . . 7
    Chemical Attack vs. Solvation . . . 9
    General Guidelines For Polymer Solubility . . . 10
  THEORETICAL SOLUBILITY PARAMETERS . . . 11
  CHEMICAL COMPATIBILITY TABLES . . . 18
  TEST METHODS FOR COMPATABILITY DETERMINATION . . . 21
4. TECHNICAL APPROACH . . . 24
  OBJECTIVES . . . 24
  PROJECT ADVISORY COMMITTEE . . . 24
  EXPERIMENTAL DESIGN . . . 25
  SELECTION OF FMLs FOR TESTING . . . 28
    Selection Criteria . . . 28
    FMLs Selected . . . 28
    Description of FMLs Received . . . 30
    FML "As Received" Properties . . . 32
  SELECTION OF IMMERSION CHEMICALS . . . 39
    Criteria for Selection of Chemicals . . . 39
    Seven Day Screening . . . 40
    Chemicals Selected . . . 41
  TEST EQUIPMENT . . . 45
    Immersion Jars . . . 45
    Weight and Dimension Tools . . . 47
    Die Punch . . . 48
    Test Chambers . . . 48
    Universal Test Machine . . . 48
    Data Handling . . . 49
    Data Evaluation . . . 51
5. TEST PROCEDURES . . . 52
  MATERIAL STORAGE AND SAMPLE TRACKING . . . 52
  SAMPLE PREPARATION . . . 53
  IMMERSION PROCEDURE . . . 55
6. QUALITY CONTROL . . . 59
  MEASUREMENT OBJECTIVES . . . 59
  WEIGHT AND DIMENSION . . . 61

- TENSILE PROPERTIES MEASUREMENT 64
- COMPLETENESS 65
- CONTROL OF IMMERSION CHEMICAL CONCENTRATION 69
- DATA CONTROL 76
- REPLICATE TEST RESULTS 76

7. SAFETY 78
   - DESCRIPTION OF HAZARDS 78
   - ACTIONS TAKEN TO PREVENT HAZARDS 79
     - Chemical Handling 80
     - Protective Clothing 80
     - Location of Safety Equipment 80
     - Transport Route 81
     - Work Area 81
     - Sample Handling 81
     - Chamber Entry and Exit 81
     - Waste Disposal 82
8. RESULTS AND DISCUSSION 83
   - OVERVIEW OF DATA PRESENTATIONS AND DISCUSSIONS 83
     - Process for Determining Chemical Resistance Criteria 83
     - Curve Fitting Response Stabilization as a Function of Time 86
     - Temperature and Concentration Effects 95
     - Response as a Function of Liner Grain (Direction) 97
     - Units of Measurement 99
     - Figures 99
   - POLYVINYL CHLORIDE (PVC) 100
     - Criteria for Determining FML Chemical Resistance 100
     - Response Time and Stability 101
     - Magnitude of Liner Response 101
     - Types of Effects 101
     - Indicators of Non-Resistance 105
   - CHLORINATED POLYETHYLENE (CPE) 114
     - Criteria for Determining FML Chemical Resistance 114
     - Response Time and Stability 118
     - Magnitude of Liner Response 118
     - Types of Effects 122
     - Indicators of Non-Resistance 123
   - ETHYLENE PROPYLENE DIENE MONOMER (EPDM) 130
     - Criteria for Determining FML Chemical Resistance 130
     - Response Time and Stability 131
     - Magnitude of Liner Response 133
     - Types of Effects 136
     - Indicators of Non-Resistance 137
   - EPICHLOROHYDRIN (EPI-CO) 145
     - Criteria for Determining FML Chemical Resistance 145
     - Response Time and Stability 148
     - Magnitude of Liner Response 149
     - Types of Effects 152
     - Indicators of Non-Resistance 153
   - HIGH DENSITY POLYETHYLENE (HDPE) 161
     - Criteria for Determining FML Chemical Resistance 161
     - Response Time and Stability 163
     - Magnitude of Liner Response 164
     - Types of Effects 167

Indicators of Non-Resistance 167
CHLOROSULFONATED POLYETHYLENE-LOW WATER ABSORPTION (CSPE-LW) . . 172
Criteria for Determining FML Chemical Resistance 172
Response Time and Stability 175
Magnitude of Liner Response 176
Types of Effects 180
Indicators of Non-Resistance 182

REFERENCES 188
APPENDICES 190

A. ADVISORY COMMITTEE MEMBERS 190
B. INITIAL SCREENING RESULTS 194
C. WEIGHT AND DIMENSION PROCEDURE 205
D. PERCENT OF TARGET CONCENTRATION 214
E. IMMERSION RESULTS 220

FIGURES

Number Page

1. PVC in brine and 0.5 percent DCE 2
2. Project diagram 26
3. One quart and two gallon immersion jars 46
4. Sample coding system 50
5. FML material storage 52
6. Sample tracking system 54
7. Pattern for typical immersion sample die cutting 57
8. Percent of target concentration of 4 percent phenol solution versus days in solution 72
9. Percent of target concentration of 4 percent furfural solution versus days in solution 73
10. Percent of target concentration of 13 percent MEK solution versus days in solution 74
11. Percent of target concentration of saturated DCE versus days in solution.. 75
12. CPE in four percent furfural at 50°C, predicted versus observed values 92
13. EPDM in eight percent furfural at 50°C 94
14. Relationship of change in physical property to furfural concentration at 23°C for PVC 96
15. Relationship of breaking factor and weight change for PVC 103
16. Effect of temperature on weight change for immersion in hydrochloric acid and sodium hydroxide at 23°C and 50°C 104
17. Relationship of breaking factor, S-100 modulus and weight change for PVC 106
18. Relationship of elongation at break and weight change for PVC. . . 107

19. Physical property change with immersion in saturated salt solution at 23°C for PVC 108
20. Physical property change with immersion in 10 percent hydrochloric acid solution at 50°C for PVC 108
21. Physical property change with immersion in 8 percent furfural solution at 23°C for PVC 110
22. Physical property change with immersion in 10 percent salt solution at 23°C for PVC 110
23. Weight change with immersion in phenol solution at 23°C for PVC. . 111
24. Physical property change with immersion in 1 percent phenol solution at 50°C for PVC 112
25. Physical property change with immersion in 4 percent phenol solution at 50°C for PVC 113
26. Physical property change with immersion in 8 percent phenol solution at 50°C for PVC. 113
27. Relationship of breaking factor and weight change for CPE. 120
28. Relationship of elongation at break and weight change for CPE. . . 120
29. Relationship of S-100 modulus and weight change for CPE. 121
30. Physical property change with immersion in saturated (35 percent) salt solution at 23°C for CPE 125
31. Physical property change with immersion in water at 23°C for CPE . 125
32. Physical property change with immersion in water at 50°C for CPE . 126
33. Physical property change with immersion in 1 percent furfural solution at 23°C for CPE 127
34. Physical property change with immersion in 4 percent furfural solution at 23°C for CPE 127
35. Physical property change with immersion in 8 percent furfural solution at 23°C for CPE 128
36. Physical property change with immersion in 1 percent furfural solution at 50°C for CPE 128
37. Physical property change with immersion in 4 percent furfural solution at 50°C for CPE 129
38. Physical property change with immersion in 8 percent furfural solution at 50°C for CPE 129

39. Relationship of tensile strength (breaking factor normalized for thickness) and weight change for EPDM. 135
40. Relationship of elongation at break and weight change for EPDM . . 135
41. Physical property change with immersion in 10 percent sodium hydroxide solution at 23°C for EPDM 139
42. Physical property change with immersion in ASTM #2 oil at 23°C for EPDM 139
43. Physical property change with immersion in ASTM #2 oil at 50°C for EPDM 140
44. Percent weight change with immersion in 10 percent hydrochloric acid solution at 23°C and 50°C for EPDM. 140
45. Physical property change with immersion in 1 percent furfural solution at 23°C for EPDM. 142
46. Physical property change with immersion in 4 percent furfural solution at 23°C for EPDM. 142
47. Physical property change with immersion in 8 percent furfural solution at 23°C for EPDM. 143
48. Physical property change with immersion in 1 percent furfural solution at 50°C for EPDM. 143
49. Physical property change with immersion in 4 percent furfural solution at 50°C for EPDM. 144
50. Physical property change with immersion in 8 percent furfural solution at 50°C for EPDM. 144
51. Physical property change with immersion in 8 percent phenol solution at 50°C for EPDM. 145
52. Relationship between breaking factor and weight change for EPI-CO 151
53. Relationship between elongation at break and weight change for EPI-CO 151
54. Relationship between tear resistance and weight change for EPI-CO 152
55. Physical property change with immersion in saturated (35 percent) salt solution at 23°C for EPI-CO. 154

56. Physical property change with immersion in water at 23°C for EPI-CO 155
57. Physical Property change with immersion in water at 50°C for EPI-CO 155
58. Physical property change with immersion in 10 percent hydrochloric acid solution at 50°C for EPI-CO 156
59. Physical property change with immersion in 1 percent phenol solution at 23°C for EPI-CO. 157
60. Physical property change with immersion in 4 percent phenol solution at 23°C for EPI-CO. 158
61. Physical property change with immersion in 8 percent phenol solution at 23°C for EPI-CO. 158
62. Physical property change with immersion in 1 percent phenol solution at 50°C for EPI-CO. 159
63. Physical property change with immersion in 4 percent phenol solution at 50°C for EPI-CO. 159
64. Physical property change with immersion in 8 percent phenol solution at 50°C for EPI-CO. 160
65. Relationship between tensile strength (normalized for thickness) and weight change for HDPE 166
66. Percent tensile, yield and tear resistant change with immersion in 10 percent sodium hydroxide solution at 50°C for HDPE 169
67. Percent elongation at yield, elongation at break, and modulus of elasticity change with immersion in 10 percent sodium hydroxide solution at 50°C for HDPE. 169
68. Percent weight change with immersion in ASTM #2 oil at 50°C for HDPE 171
69. Percent tensile yield and tear resistance change with immersion in ASTM #2 oil at 50°C for HDPE. 171
70. Percent elongation at yield, elongation at break, and modulus of elasticity change with immersion in ASTM #2 oil at 50°C for HDPE 172
71. Relationship between breaking factor and weight change at 23°C for CSPE-LW. 177
72. Relationship between S-100 modulus and weight change for CSPE-LW . . 178

73. Relationship between tear resistance and weight change at 23°C for CSPE-LW. 179

74. Relationship between elongation at break and weight change for CSPE-LW. 180

75. Relationship between elongation at break and S-100 modulus at 23°C for CSPE-LW 181

76. Relationship between elongation at break and tear resistance at 23°C for CSPE-LW 181

77. Physical property change with immersion in saturated (35 percent) salt solution at 50°C for CSPE-LW. 184

78. Physical property change with immersion in 10 percent sodium hydroxide solution at 50°C for CSPE-LW 184

79. Physical property change with immersion in ASTM #2 oil at 23°C for CSPE-LW. 185

80. Physical property change with immersion in ASTM #2 oil at 50°C for CSPE-LW. 186

81. Physical property change with immersion in 8 percent phenol at 23°C for CSPE-LW 186

82. Physical property change with immersion in 8 percent phenol at 50°C for CSPE-LW 187

TABLES

NAME PAGE

1. CHEMICAL RESISTANCE CRITERIA 6
2. SOLUBILITY PARAMETER DATA 14
3. COMPARISON OF IMMERSION RESULTS AND SOLUBILITY PARAMETER DIFFERENCES. 16
4. SAMPLE GUIDELINES FOR EVALUATING POLYMER CHAMICAL RESISTANCE TEST DATA 20
5. FML MATERIALS SELECTED FOR CHEMICAL RESISTANCE TESTING 29
6. AS RECEIVED PROPERTIES: 30 MIL POLYVINYLCHLORIDE (PVC) 33
7. AS RECEIVED PROPERTIES: 30 MIL CHLORINATED POLYETHYLENE (CPE). . . 34
8. AS RECEIVED PROPERTIES: 30 MIL ETHYLENE PROPYLENE DIENE MONOMER (EPDM) 35
9. AS RECEIVED PROPERTIES: 60 MIL EPICHLOROHYDRIN (EPI-CO). 36
10. AS RECEIVED PROPERTIES: 30 MIL HIGH DENSITY POLYETHYLENE (HDPE). . 37
11. AS RECEIVED PROPERTIES: 30 MIL CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION (CSPE-LW) 38
12. INITIAL SCREENING CHEMICALS AND CONCENTRATIONS 40
13. CHEMICAL IMMERSIONS SELECTED FOR FML IMMERSION TESTS 41
14. PHYSICAL PROPERTIES TEST FOR IMMERSION SAMPLES 58
15. QUALITY CONTROL OBJECTIVES FOR MATERIAL PROPERTIES TESTS 60
16. REPLICATION SYSTEM FOR PHYSICAL PROPERTIES TESTS 61
17. MEANS AND STANDARD DEVIATIONS FOR EACH TECHNICIAN. 62
18. PRECISION OF TECHNICIANS 63
19. COMPARISON OF NSF AND MANUFACTURER TENSILE PROPERTIES TEST RESULTS 66
20. COMPARISON OF NSF AND USBR TENSILE PROPERTIES TEST RESULTS 67
21. PERCENT COEFFICIENT OF VARIATION OF TENSILE PROPERTIES TESTS FOR UNIMMERSED MATERIAL. 68
22. PERCENT COMPLETION OF DATA 69

23. LOW AND HIGH PERCENT TARGET CHEMICAL CONCENTRATIONS AFTER INITIAL MIXING 71
24. POTENTIAL HAZARDS OF IMMERSION CHEMICALS 78
25. RESPONSE SUMMARY FOR CHEMICAL RESISTANCE: PVC 102
26. RESPONSE SUMMARY FOR CHEMICAL RESISTANCE: CPE 115
27. COMPARISON OF MANUFACTURER'S DATA TO NSF DATA FOR CPE RESISTANCE TO SODIUM HYDROXIDE 117
28. RESPONSE SUMMARY OF CHEMICAL RESISTANCE: EPDM 132
29. RESPONSE SUMMARY OF CHEMICAL RESISTANCE: EPI-CO 146
30. RESPONSE SUMMARY OF CHEMICAL RESISTANCE: HDPE 162
31. VARIABILITY IN HDPE TEST MEASUREMENTS. 166
32. RESPONSE SUMMARY OF CHEMICAL RESISTANCE: CSPE-LW 174
33. COMPARISON OF MANUFACTURER'S DATA TO NSF DATA FOR CSPE-LW RESISTANCE TO PHENOL 175

ACKNOWLEDGMENTS

Members of the Project Advisory Committee (Appendix A) provided useful insight, criticism, and recommendations throughout this project. The donation of their time and talent was very much appreciated.

Dr. Clinton Allen's (NSF, retired) years of experience with plastics testing was instrumental in establishing efficient procedures for sample handling and quality control.

Additional assistance and information were provided by other individuals. The authors would particularly like to acknowledge the following people:

Dr. Robert Wolfe, University of Michigan Department of Biostatistics		(curve fitting)
Martin Greiner	NSF	(testing)
Rod Soyka	NSF	(testing)
Yong Kim	NSF	(testing)
Jim Endres	NSF	(analytical chemistry)
Gloria Hunt	NSF	(typing)
Ann Lewis	NSF	(graphics)
Bruce Low	NSF	(data editing)
Keith Goodchild	NSF	(data management)

ABBREVIATIONS AND SYMBOLS

ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
CPE	CHLORINATED POLYETHYLENE
CSPE-LW	CHLOROSULFONATE POLYETHYLENE - LOW WATER ABSORPTION
EPDM	ETHYLENE PROPYLENE DIENE TERPOLYMER (SOMETIMES CALLED ETHYLENE PROPYLENE DIENE RUBBER)
EPI-CO	EPICHLOROHYDRIN
FML	FLEXIBLE MEMBRANE LINER
HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYLCHLORIDE
SD	STANDARD DEVIATION
δ	SOLUBILITY PARAMETER
DCE	1,2-DICHLOROETHANE
MEK	METHYL ETHYL KETONE
ANOVA	ANALYSIS OF VARIANCE
RMSE	ROOT MEAN SQUARED ERROR

ENGLISH TO METRIC CONVERSIONS

TO CONVERT FROM	TO	MULTIPLY BY
BTU/Ft^3	CAL/cm^3	.0089
°F	°C	(T-32) x 0.555
Ounces	Grams	28.349
Inches	Centimeters	2.540
Foot Pounds	Joules	1.356
PSI	MPa	.0069
Mil	Millimeters	0.0254
Ounces	Milligrams	0.028
Ounces (U.S. fluid)	Milliliters	29.573
Pound	Grams	453.592
PSI ($pounds/in^2$)	$Grams/cm^2$	70.307

SECTION 1

INTRODUCTION

Flexible membrane liners (FMLs) are used increasingly as lining materials for hazardous waste containment, in landfills and surface impoundments. A double-liner system, including at least one synthetic liner, is required in all new installations (1). The FML used in a waste containment application must show long-term chemical resistance to the waste stream.

Waste streams are mixtures of chemical substances, with some chemical components present in small or trace quantities. The presence of some trace components may be unknown at the time a liner is being selected. Published chemical resistance tables generally list only pure components, or mixtures of one component in water. A small amount of a substance deleterious to the liner could be present in a mixture whose major component has no effect. Looking only at the effect of the major component in tables, the liner would appear to be resistant. The presence of the incompatible chemical could mean the difference between success and failure of the installation. As an example of the effect of a small amount of an incompatible chemical, Figure 1 compares the change in weight of the PVC liner used in this study in two solutions of very different concentrations. Percent weight change is shown as a function of immersion time. While a saturated brine solution (approximately 35% by weight) causes very minor changes in FML weight, a 0.5% solution of 1,2-dichloroethane (DCE) results in much greater weight gain. A waste containing both components might be classified as a brine waste, and chemical resistance predicted.

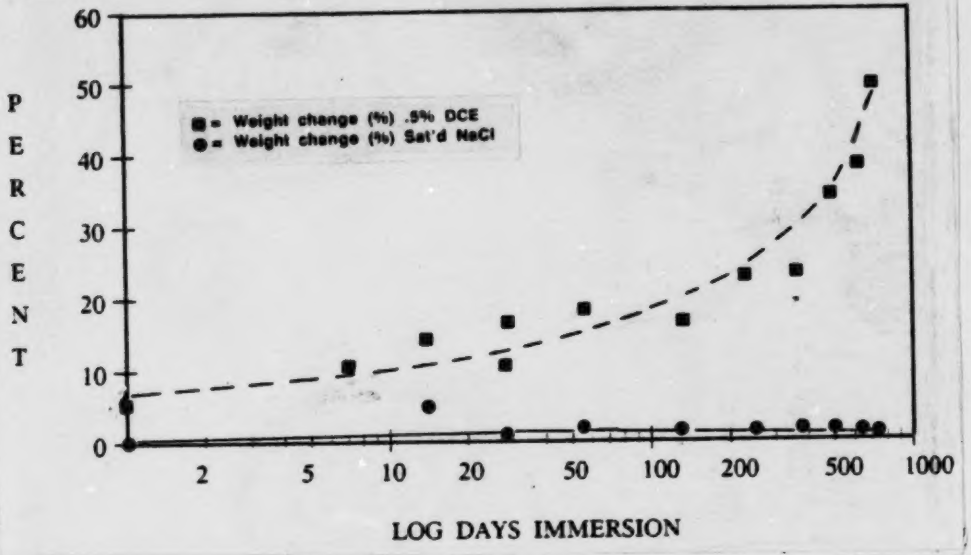


Figure 1. PVC in brine and 0.5 percent DCE

For these reasons, the EPA requires that FML selection be based on evaluation of changes in physical properties resulting from immersion in the actual waste to be contained. Several similar immersion test methods have been developed to determine chemical resistance, with guidance on duration, temperature, and types of tests to be performed (2). Evaluation of the test results has not been well defined, however, the EPA considers "any significant deterioration in any of the measured properties to be evidence of incompatibility unless a convincing demonstration can be made that the deterioration exhibited will not impair the liner integrity over the life of the facility" (3).

More guidance information is needed to be made available to FML users, who must select the most appropriate lining material and demonstrate its resistance to the wastes. Theoretical methods of predicting chemical resistance such as Hansen solubility parameters and cohesive energy density numbers (4) are not yet well developed for FMLs, and expert systems for data interpretation (5) are not currently refined and available. Acceptable changes in a physical property such as tensile strength at a given temperature and immersion time may be different for different FML materials. This project was initiated by the EPA (cooperative agreement #CR 810727) to help develop chemical resistance selection guidance information for FML users.

In this project, immersion testing of six FMLs was conducted at two temperatures (23° C and 50° C) with a broad range of chemical exposures. FML property changes were measured for exposure periods from one day to two years. Results were studied to determine the basic FML responses to combinations of chemical challenge, concentration, temperature, and time. The focus in data interpretation was on the types of degradation encountered, stabilization of the material response, the extent of property change, and indicators of non-resistance (6). The method of interpretation can then be generalized to provide guidance to FML users testing FMLs with specific waste streams.

SECTION 2

CONCLUSIONS AND RECOMMENDATIONS

- Immersion testing of a liner in the waste it is intended to contain is essential for determining chemical resistance. Low concentrations of some chemicals can cause more significant change in FML physical properties than higher concentrations of other chemicals. Testing with major constituents would not be satisfactory.

- The stabilization of a material's response to a chemical challenge, when considered in conjunction with the magnitude of that response, is an important parameter in the evaluation of chemical resistance.

- The proposed method of determining stability may be useful in determining longevity of service based on chemical resistance, and also for comparing FMLs for relative suitability for waste containment.

- Increasing the immersion temperature may be used to accelerate the FML response to determine chemical resistance. For some chemical/material combinations, however, increasing the immersion temperature to 50° C produced a different response from the FML, instead of an accelerated response. An elevated temperature may provide a test that is too aggressive for some FMLs to simulate anticipated use (e.g., elastomers).

- Not all materials are suitable for service at 50° C. Heat degradation is an important consideration in conjunction with chemical resistance.

- Water is sometimes an aggressive medium in itself, especially in conjunction with an elevated temperature. The effect of water alone on an FML must be evaluated when evaluating chemical resistance.

- Increasing the concentration of organic solvents in water solution in general increased the magnitude of the FML response (physical changes).

- Weight change is a valuable indicator of material change for all FMLs tested.

- Minimum as-received property values listed in NSF Standard 54 for Flexible Membrane Liners (7) can be useful as benchmarks in evaluating chemical resistance test results.

- Compatibility tables can best be used to screen FMLs to find possibly incompatible combinations. The limitations of compatibility tables are that materials are usually rated qualitatively: (good, fair, poor) and the test conditions used to determine resistance are not always detailed.

- The proposed criteria for chemical resistance of the FMLs tested in this project generally agree with ratings given in existing chemical resistance tables. The criteria may possibly be expanded to evaluate immersion data for USEPA Method 9090 (8).

- Generalization of the criteria and chemical immersion responses of the FMLs tested in the project must be done with caution. Similar liner materials (such as two polar elastomers) may be expected to respond similarly, but the degree of the response (amount of property change) may change with different formulation and fabrication techniques.

Chemical resistance criteria for the six materials tested are shown in Table 1.

TABLE 1

CRITERIA FOR DETERMINING FML CHEMICAL RESISTANCE

Criteria	Material Type	Material Type	Material Type	Material Type	Material Type	Material Type
	PVC (Plasticized Thermoplastic)	CPE* (Thermoplastic)	HDPE (Partially Crystalline)	EPDM ("Non-polar" Cross-linked Rubber)	EPI-CO ("Polar Cross-Linked Rubber)	CSPE-LW (Vulcanized Rubber)
Stability	Yes	Yes	Yes	Yes	Yes	Yes
Weight gain Stability	-10% ≤ Wt. change ≤ 5%	≤ 25%	≤ 3%	≤ 30%	≤ 20%	≤ 5%
Breaking Factor	≥ 80% of initial and ≥ NSF Std. 54	≥ 75% of initial and ≥ NSF Std. 54	≥ 80% of initial and ≥ NSF Std. 54	≥ 80% of initial and ≥ NSF Std. 54	≥ 80% of initial and ≥ NSF Std. 54	≥ 80% of Initial
% Elongation at Break	≥ 70% of initial and ≥ NSF Std. 54	——	≥ 80% of initial and ≥ NSF Std. 54	≥ 75% of initial and ≥ NSF Std. 54	≥ 70% of initial and ≥ NSF Std. 54	> 125% of Initial
Yield Strength	——	——	≥ 80% of initial and ≥ NSF Std. 54	——	——	——
% Elongation at Yeild	——	——	≥ 80% of initial and ≥ NSF Std. 54	——	——	——
Tear Resistance	——	≥ 70% of initial and ≥ NSF Std. 54	≥ 80% of initial and ≥ NSF Std. 54	——	——	≥ 80% of Initial
Modulus of Elasticity	——	——	≥ 70% of initial and ≥ NSF Std. 54	——	——	——
S-100 Modulus	60% < S-100 Modulus < 140%	≥ 70% of initial and ≥ NSF Std. 54	——	——	——	≥ 70% of Initial

* All criteria for 23 C immersion tests

SECTION 3

METHODS FOR PREDICTING CHEMICAL RESISTANCE OF POLYMERS

BASIC PRINCIPLES OF POLYMER INTERACTION IN SOLVENTS

This section discusses types of polymers, methods of chemical attack, and general guidelines for determining polymer resistance. This is a general treatment of polymers, not specific to flexible membrane liners.

Polymer Types

A polymer molecule is a large molecule composed of repeated smaller units (monomers) joined together by covalent bonds. The word polymer also applies to the materials made up of these molecules.

Polymeric materials can be classified in several ways. Most often they are classified on the basis of response to heat, method of synthesis, response to force, and chemical structure. A complete list of terms and definitions relating to polymers can be found in ASTM D883-83 (9).

Response to Heat—

Polymers are either thermoplastic or thermosetting. A thermoplastic material is one which can be repeatedly made to flow when heated and subjected to stress. A thermosetting material can be heated and made to flow under stress only once. It undergoes a curing reaction caused by the heating, in which chemical bonds are formed between polymer chains. The resulting network is unable to flow under stress.

Method of Synthesis—

Two basic methods of synthesizing polymers are addition and condensation. Addition polymers are those polymers in which the monomers are joined together in what is called an addition reaction. Addition reactions have two characteristics: First, that the reaction involves breaking a double bond, and second, that the polymer has the same chemical formula as the monomer (nothing is split off during the reaction). Condensation polymers are polymers formed by a condensation reaction. A condensation reaction is one in which a small molecule (usually water) is split off when the joining bonds are formed.

Response to Force—

Two types of behavior in polymers, elastic and plastic, are used for classification. Elastic behavior involves deformation under stress, with a return to original form when the stress is removed. Plastic behavior involves irreversible flow under stress. Polymers classified as plastics (thermoplastics) have an elastic response to a small stress, but as the stress is increased they show irreversible plastic deformation of flow. Polymer materials classified as elastomers have a much greater ability to reversibly deform when force is applied. They will not show appreciable plastic deformation before failing.

Chemical Structure—

Terms such as linear, branched, crystalline and crosslinked are used in classifying polymers according to their chemical structure. A linear polymer is made from monomers able to join only on the ends, and the resulting chain, although in reality quite convoluted, if stretched out would be linear. Branching occurs when the monomers can form bonds at different points on the polymer structure in addition to at the beginning and end. A chain with many branches, long or short, can be formed. The difference in linear and branched structure will affect the polymer properties.

A polymer which is partially crystalline (no polymer is 100% crystalline) has areas in which the chains are lined up in a regular arrangement, with secondary associative bonds holding this arrangement together. These areas are the crystalline regions, and the rest, where the chains are randomly tangled, are called the amorphous regions. In general, linear polymers have a greater ability to form crystalline regions, because it is easier to align the chains. Branching tends to obstruct the chains, keeping them in an amorphous form. The degree of crystallinity of a polymer also affects its properties, including chemical resistance.

Crosslinking refers to covalent bonds formed between adjacent polymer chains. These bonds are much stronger than the secondary bonds of crystalline structure. Vulcanization is one kind of crosslinking, done by adding sulfur and heat. Most elastomers have been crosslinked to improve their elastic response. This crosslinking holds the chains together so that they cannot slip and flow with applied stress.

A thorough discussion of flexible membrane liner technology, the different types of polymers used to make them, and their properties can be found in the EPA document "Lining of Waste Impoundment and Disposal Facilities" (10)

Chemical Attack vs. Solvation

A polymeric lining material may be chemically degraded by two basic mechanisms, chemical attack and solvation. Chemical attack involves making and breaking covalent bonds in the polymer structure, thus producing irreversible chemical changes in the polymer chain. Chemical attack is generally caused by acids, alkalies, oxidizers, and salts. The susceptibility of a polymer to be attacked by a chemical is determined by the structure of the polymer chain (11).

Polymers with polar groups are more likely to be attacked by acids, alkalies, and salts, which are polar, while nonpolar polymers are more resistant to attack by polar compounds. The resistance of reactive groups on the polymer to chemicals is also important. An alkaline chemical may saponify ester groups in a polymer such as polyvinyl acetate. It could hydrolyze a cyano group in acrylonitrile, or react with acidic functional groups in phenolic resins. Acids can also hydrolyze reactive groups, and hydrochloric acid can react with double bonds to form a chlorinated polymer different than the original. Polymers, as organic compounds, are subject to oxidation, in air or by an oxidizing agent. Chemicals such as chromic acid, nitric acid, chlorine dioxide, and fuming sulfuric acid can oxidize many functional groups. Unsaturated polymer chains are especially vulnerable (12).

Solvation occurs when a substance (the solvent) penetrates the polymer and disrupts the secondary bonds between chains, replacing them with secondary bonds between polymer and solvent. The polymer chain itself remains the same, and can be recovered by evaporation of the solvent; however, additives (e.g. plasticizers) may be lost in the process. The susceptibility of a polymer to solvation by a solvent depends on the relative similarity between the polymer and the solvent. This similarity can be predicted, based on structure/activity relationships, by the solubility parameter, discussed later.

General Guidelines For Polymer Solubility

The solubility of a polymer in a solvent decreases with increasing density and molecular weight of the polymer. An increase in branching of the polymer tends to increase solubility. This is partially because the density of the polymer is usually decreased with branching, making it easier for solvent molecules to penetrate the polymer. With polymers that are crystalline to some extent, an increase in branching also provides steric hindrance to crystallinity. This will also tend to increase the solubility of the polymer in the solvent.

The more crystalline the polymer, the less likely it is to be soluble in a given solvent. This is partially caused by the increased density seen with increasing crystallinity, making it harder for the solvent to penetrate the polymer structure. Crystallinity occurs when strong secondary bonds form between adjacent polymer chains, keeping the chains close together and lined up in a regular arrangement. The solvent must overcome these secondary bonds in order to separate the chains and dissolve the polymer.

As with chemical attack, the rule "like dissolves like" applies in general to polymer/solvent systems. A polar solvent is more likely to dissolve a polymer with polar groups, while a non-polar solvent is more likely to dissolve a non-polar polymer. For example, water with the polar (OH) group will dissolve polyvinyl alcohol (13), while natural rubber, a nonvulcanized hydrocarbon rubber, will be dissolved by gasoline.

Crosslinking, or forming covalent bonds between adjacent polymer chains, reduces a polymer's solubility by reducing its capacity to expand (swell) and take up solvent within the polymer matrix (13). Swelling does not always indicate polymer destruction or incompatibility. The amount of swell exhibited by a polymer exposed to a given solvent can be used as a measure of the extent of polymer crosslinking (10). The more crosslinked a polymer is, the less it will swell.

Additives used to alter the properties of a polymer, for example, to enhance its resistance to ultraviolet light, may alter its chemical resistance. The types and amounts of additives, such as plasticizers and fillers, vary from manufacturer to manufacturer and from one intended application to another. Additives may affect a polymer's suitability for use with a given chemical waste.

The solubility of a polymer in a given solvent increases with increasing temperature.

THEORETICAL SOLUBILITY PARAMETERS

One way of predicting the solubility of a polymer in a solvent is with the solubility parameter, developed by Hildebrand and Scott (12). The solubility parameter is a measure of the compatibility of a solvent and solute based on the change in enthalpy on mixing. The closer the solubility parameter for a solvent and solute, the more likely they are to be mutually soluble.

The solubility parameter is defined as the square root of the cohesive energy density, a measure of the strength of intermolecular forces in the liquid state. The cohesive energy density is the molar change in internal energy on vaporization divided by the molar volume of the liquid (4). Solubility parameters for solvents can be calculated from the energy of vaporization, and for polymers are measured empirically by finding the solvent that is most compatible (that is, that most easily dissolves the polymer). Solubility parameters are measured in $(\mathrm{MPa})^{1/2}$ or hildebrands $(\mathrm{cal/cm^3})^{1/2}$. The equation for the solubility parameter is:

$$\delta = (\mathrm{CED})^{1/2} = [E_v/v]^{1/2}$$

where δ = solubility parameter $(\mathrm{MPa})^{1/2}$

CED = Cohesive Energy Density (MPa)

E_v = molal change in internal energy of vaporization (J)

v = molal volume (cm^3)

Solubility parameters are used extensively in the paint and coatings industry to predict the dissolving power of multi-solvent blends. Solubility parameter data exists for many substances, including pure chemicals, blends (such as ASTM #2 Oil), and polymer resins.

Some of these values have been determined empirically, some have been calculated. For mixtures where no chemical interaction occurs, the effective solubility parameter for a binary mixture can be calculated using the following equation:

$$\delta_{mix} = (\delta_1 \phi_1 + \delta_2 \phi_2)$$

where δ_{mix} = mixture solubility parameter $(\mathrm{MPa})^{1/2}$

δ_1 = solubility parameter component 1 $(\mathrm{MPa})^{1/2}$

δ_2 = solubility parameter component 2 $(\mathrm{MPa})^{1/2}$

ϕ_1 = volume fraction component 1

ϕ_2 = volume fraction component 2

There are several types of solubility parameters. The original is the Hildebrand parameter. This is the overall solubility parameter as described above. While this parameter is useful in many situations, polymer solubility is generally too complex to be described by a single parameter. Supplementary solubility parameter methods have been developed which take into account the effect of dipole interactions and hydrogen bonding. One of these is the Hansen parameter.

The Hansen solubility parameter (δ) is a three-dimensional representation of a substance's solubility potential. The solvent represents a point in space, with the solubility parameter defining the vector from the origin to this point (4). The three components of the Hansen parameter represent dispersion (van der Waals forces) (δ_d), the permanent dipole interactions (δ_p), and hydrogen bonding (δ_h). The overall magnitude of the solubility parameter is then represented as:

$$\delta^2 = (\delta_d)^2 + (\delta_p)^2 + (\delta_h)^2$$

The absolute magnitude of the solubility parameter does not show how generally soluble the substance will be. The difference between the solubility parameters of two substances indicates the likelihood of mutual solubility. The smaller the difference between the two parameters, the more likely they are to be mutually soluble. For example, water, with an overall solubility parameter of 48 $\text{MPa}^{1/2}$, is not likely to dissolve ASTM Oil #2, which has an overall solubility parameter of 15.5 $\text{MPa}^{1/2}$ (see Table 2).

For Hansen parameters, the magnitude of the difference between two solubility parameters is calculated by subtracting the two vectors according to the following equation:

$${}^{ij}A^{1/2} = [({}^{i}\delta_d - {}^{j}\delta_d)^2 + ({}^{i}\delta_p - {}^{j}\delta_p)^2 + ({}^{i}\delta_h - {}^{j}\delta_h)^2]$$

where ${}^{ij}A^{1/2}$ = magnitude of difference
${}^{i}\delta$ = parameter of component i
${}^{j}\delta$ = parameter of component j

TABLE 2. SOLUBILITY PARAMETER DATA

LIQUID HANSEN SOLUBILITY PARAMETERS (MPa)$^{1\ 2}$

Pure Chemicals	δ_d	δ_p	δ_h	δ_t	Source
Water	12.3	31.3	34.2	48	(1)
ASTM Oil #2	15.6	0.6	0.2	15.5	(1)
Methyl Ethyl Ketone	16.0	9.0	5.1	19	(1)
Phenol	18.0	5.9	14.9	24.1	(1)
Furfural	18.6	14.9	5.1	24.4	(2)
1.2-Dichloroethane	19.0	7.4	4.1	20.9	(2)
Chemical/Water Solutions					
MEK 3%	12.44	30.47	33.12	46.7	(3)
MEK 13%	12.88	27.82	29.66	42.7	(3)
MEK 26%	13.42	24.52	25.35	37.7	(3)
Phenol 1%	12.35	31.06	34.02	47.7	(3)
Phenol 4%	12.52	30.33	33.47	46.9	(3)
Phenol 8%	12.73	29.37	32.73	45.8	(3)
Furfural 1%	12.35	31.16	33.95	47.7	(3)
Furfural 4%	12.51	30.74	33.21	47.0	(3)
Furfural 8%	12.73	30.18	32.22	46.0	(3)
DCE 0.1%	12.31	31.28	34.18	47.9	(3)
DCE 0.5%	12.33	31.2	34.08	47.8	(3)
DCE 0.9%	12.35	31.13	33.98	47.7	(3)
Polymeric Materials					
Polyethylene	17.3	0	0	17.3	(4)
PVC	18.7	10.0	3.1	21.4	(4)
Nat. Rubber	18.4	2.1	7.2	----	(4)
Ethylene Propylene Copolymer	18.0	0.8	2.1		(4)

(1) Table 6. Chapter 8. Reference 4
(2) Table 5. Chapter 8. Reference 4
(3) Calculated from above values
(4) Table 14. Chapter 14. Reference 4

Table 2 presents solubility parameter data for the chemicals used in this project, and for some polymeric materials used to make flexible membrane liners. The first part of the table presents Hansen parameters for the pure chemicals used. These values were taken from the literature, and the sources are listed. The second part of the table presents calculated values for the chemical/water solutions used in immersion testing. The third part of the table gives Hansen parameters for some polymeric materials.

Solubility parameters such as this may be useful for predicting the compatibility of wastes and polymeric lining materials for combinations where solvation is the primary or only interaction between the waste and the liner. In cases where the difference between solubility parameters is small, the liner could soften, swell, lose strength, or become permeable to the waste. A comparison can be made of the data generated in this EPA/NSF project and published solubility parameter values.

For example, the difference in solubility parameters for PVC and for methyl ethyl ketone is calculated by subtracting the two parameters, using vector arithmetic. Using the previous equation, the difference is:

$$ {}^{ij}A^{1/2} = [\ (18.7 - 16.0)^2 + (10.0 - 9.0)^2 = (3.1 - 5.1)^2\ ]^{1/2} = 3.5\ \mathrm{MPa}^{1/2} $$

Table 3 shows one way that the project data can be compared to solubility parameter predictions. The differences in solubility parameters between a polymer and a chemical are calculated for two materials, polyethylene and polyvinyl chloride, and for three chemicals: MEK, ASTM Oil #2, and water. Also shown are summaries for weight and percent retention of breaking factor data. The average and maximum weight and percent retention of breaking factor for the material/chemical combinations are listed. (These data represent all time exposures and both temperatures). Solubility parameter differences are calculated using the above equation and the values listed in Table 2.

It must be noted here that the solubility parameters are given for pure compounds. A PVC liner is not a pure compound, but contains additives to

TABLE 3. COMPARISON OF IMMERSION RESULTS AND SOLUBILITY PARAMETER DIFFERENCES

Material	Chemical	Concentration	Maximum Percent Weight Change (%)	Average Percent Weight Change (%)	Maximum Percent Retention Breaking Factor (%)	Average Percent Retention Breaking Factor (%)	Difference Between Solubility Parameters $(MPa)^{1/2}$
HDPE	Oil	100%	7.0	3.5	100.6	92.6	1.8
	MEK	Saturated	2.2	1.6	116.6	91.1	11.1
	Water	100%	1.1	0.07	112.8	102.6	46.6
PVC	MEK	Saturated	134.4	41.5	131.0	21.3	3.5
	Oil	100%	-0.6	-7.4	188.1	100.8	10.3
	Water	100%	2.7	1.2	105.7	98.1	38.2

improve its flexibility and biological resistance. A HDPE liner has additives to improve its ultraviolet resistance. Also, the data given for MEK is for a water-saturated solution.

Nevertheless, several interesting things are apparent looking at the table. For polyethylene, as the difference between the solubility parameters for polyethylene and a chemical increases, the magnitude of change in weight and volume decreases. This is the expected relationship. Oil, with the smallest difference in Hansen parameters from polyethylene, causes the largest change in weight and volume. Water, with the largest difference, causes the smallest changes.

At first glance, this does not seem to hold for polyvinyl chloride. Looking again at Table 3, the large weight and volume changes for PVC in methyl ethyl ketone correspond to a small difference in solubility parameters. The small change in water correspond to a large difference in solubility parameters. But for oil, the relationship does not hold. Where one would expect to find weight and volume changes somewhere between those for MEK and for water, one finds instead a net loss in weight and volume.

Observations of PVC liner samples after oil exposure showed that they became smaller and stiffer with time. This evidence suggests that a plasticizer added to the formulation was extracted by the oil. The migration of plasticizer was the predominant change in the liner samples, rather than oil. Plasticizer removal by oil is a well-known phenomenon (14,15). One might expect to find that the solubility parameters for the plasticizer and oil are even closer than for the polymer and the oil.

As mentioned before, substances added to a liner formulation to modify the polymer properties can affect the solubility properties. Also, this shows that the reaction of a liner sample can sometimes depend on the properties of the additives more than on the base polymer itself.

Another limitation of using solubility parameters to predict the compatibility of complex wastes and polymeric lining materials is that the possibility of chemical attack is not taken into account. The solubility parameter is limited to predicting the likelihood of mutual solubility between liner and waste.

Solubility parameters are intended to predict the ability of a solute to be dissolved in a solvent. Normally, the solute is present in much smaller quantity than the solvent, and is dispersed homogeneously in the solvent (or solvent blend). This is not the case in chemical immersion testing, or in liner/waste contact situations. The 'solvent' (the waste) may be present in dilute form in water solution, while the 'solute' (the polymeric liner) is a solid sheet in contact with the waste.

A solvent of interest (such as MEK in water solution) may be preferentially absorbed by the liner making its effective concentration in the polymer matrix much higher than that in the waste solution. The net effect may be much more severe than predicted using a calculated solubility parameter for the binary solution (such as MEK/water, see Table 2).

Although solubility parameters should not be used as the only tool for making predictions of compatibility, however, they can be used as a screening tool to eliminate obvious incompatible liner chemical combinations. Some general rules have been suggested (4). Non-crystalline and uncrosslinked polymers will usually dissolve in a solvent which has a solubility parameter within ± 1.8 Hildebrand units of the polymer. Polymers will tend to swell in solvents with solubility parameters within ± 3.2 of the polymer.

CHEMICAL COMPATIBILITY TABLES

There are many existing chemical compatibility tables for polymers, both from textbooks and from manufacturers. Some of the tables refer to the pure polymer, and some to a specific manufacturer's formulations.

The chemical compatibility or chemical resistance tables currently available do not clearly define compatibility. Terms such as good, fair, and poor are used to describe resistance of polymeric materials to chemicals without specifying chemical concentrations, exposure conditions, or how distinctions between good, fair, and poor are made.

However, chemical compatibility tables which provide information of sufficient specificity to make intelligent compatibility decisions would be infinitely large, and would not eliminate the need for testing a liner with the mixture it is intended to contain. Tables cannot replace testing because tables cannot take into account synergistic or antagonistic effects of mixtures of chemicals found in waste streams.

Initial chemical compatibility screening can be accomplished with some understanding of the polymer/chemical interaction principles briefly discussed in this document and the use of some currently available tables. Although current tables cannot be used to make final liner waste compatibility decisions, some tables may be used to determine which liner-waste combinations are unacceptable.

Specific liner waste compatibility testing is required by regulation, but procedures for evaluating results of testing to predict performance are not documented. A chemical compatibility evaluation table could be designed to assist the table user in evaluation of immersion test results. The testing results for this and other concurrent projects should provide the basis for a chemical evaluation table(s).

The project results will be evaluated in terms of material property changes versus time of exposure, concentration of exposure, temperature of exposure, and various combinations of time, concentration, and temperature. In addition, when possible, laboratory data should be correlated with field experience. With these data, specific criteria will be developed for property changes which will provide a common base of evaluation. For example, tensile property changes of less than 20 percent for polymer A in a waste or leachate is satisfactory performance for an immersion of seven days at 23°C.

This concept is advocated in the 1982-83 edition of the Modern Plastics Encyclopedia (16). The following table of guidelines for evaluating the extensive chemical resistance chart in the encyclopedia is fashioned after the one on Page 44 of the encyclopedia.

TABLE 4.

SAMPLE GUIDELINES FOR EVALUATING POLYMER CHEMICAL RESISTANCE TEST DATA

Level of Significance	Change in Weight, %	Change in Dimension, %	Change in Tensile Strength, %
Usually not Significant	<5	<2	<10
Significant but usually not conclusive	5-10	2-4	10-20
Usually significant	>10	>4	<20

Polymer properties may differ, consequently changes in properties may have different significance for different polymers. The chemical compatibility evaluation table must take this into account.

A table of this nature could be used in more than one way. Because the basis for distinction between levels of significance of test results is specified, a knowledgeable and experienced designer could make a final selection with some degree of confidence even if some test results were borderline.

This evaluation table approach could be further expanded to incorporate weighting factors for different tests. For example:

Test	Weight	Dimension	Tensile
Weighting	0.4	0.2	0.4
Percent Change			
Acceptable	<5	<2	<10
Marginal	5-10	204	10-30
Unacceptable	>10	>4	>30

The sum of the weighting factors would always equal one. An overall grade for polymer A of less than 6.4, [(0.4x5)+(0.2x2)+(0.4x10)] would indicate overall acceptability, 6.4 to 16.8 would be marginal, and greater than 16.8 would be unacceptable. Conceivably, a material might be marginal for one test, but still be acceptable overall.

The weighting factors might be different for different materials because the significance of say, dimension or tensile change is not necessarily the same for all materials. Consequently, a system, such as just described, would allow direct comparison of materials of different polymeric structures because the relative importance of each test is considered for all materials.

TEST METHODS FOR COMPATIBILITY DETERMINATION

The U.S. Army Toxic and Hazardous Materials Agency conducted compatibility tests for FMLs with explosives and trichloroethylene. They studied alternative test methods and chose the initial screening method of the NSF Proposed Standard for FMLs. They felt that this method represented a compilation of the views of manufacturers, users, and regulatory agencies (17).

Their comments on using this test method were that it was easy to use and reproducible but that specific test procedures had to be developed before using it. They found weight measurements quite reproducible, dimension measurements less so. The Agency also commented that data interpretation was somewhat subjective due to the lack of established evaluation criteria.

The test method selected for this study was similar to the NSF method used by the Army. EPA Method 9090 is also similar. But at the time this study was started, neither immersion procedure (Method 9090 and NSF Standard 54) was available.

When evaluating a polymer for its resistance to a particular chemical, several criteria can be used. Visual observations give valuable information about the condition of the polymer exposed to a chemical. Changes measured in mechanical properties can also indicate whether the polymer is suitable for use with the chemical.

Visual effects noted can include swelling, discoloration, blistering, embrittlement, and softening. Of these, softening and swelling, usually found together, are the most indicative of loss of useful properties. Swelling occurs as a solvent penetrates the polymer structure, loosening secondary bonds between polymer chains and replacing them with solvent-polymer associations. This can result in loss of mechanical properties.

Changes in mechanical properties include tensile strength, tear strength, hardness, permeability, puncture resistance, elongation and environmental stress cracking. One or more of these properties may be measured when evaluating a polymer for chemical resistance.

Several test methods are available for testing. ASTM D543 is a standard method used for all plastics (18). It is an immersion test listing 51 standard chemicals at standard concentrations. Properties measured include change in weight, dimensions, tensile strength, and elongation.

EPA Method 9090 is also an immersion test, but it is designed specifically to evaluate flexible membrane liner material for use in the containment of chemical wastes, it specifies that the actual waste be tested. Properties measured include change in weight, dimension, tensile strength, elongation, hardness, and tear resistance (8).

The National Sanitation Foundation Proposed Standard for flexible membrane liner material also has an exposure test for evaluating chemical resistance of liner material (7). This test is modeled on ASTM D543, the more general plastics evaluation procedure. The test program is two-phased, with an initial evaluation that measures change in weight and dimensions while observing visual changes in material exposed to the waste chemicals. The second phase of testing, for those materials which look promising based on the initial evaluation, is a longer immersion followed by physical properties testing which includes tensile strength, tear resistance, and elongation.

Manufacturers of polymers and of FMLs use either their own test methods or some form of the above methods.

All of the above test methods can be run at either room temperature, or at elevated temperatures. It has been suggested that a temperature of 50°C be used as the higher temperature unless the actual intended application is at an even higher temperature, in which case the actual intended temperature should be used (2). However, results from this study indicated that elevated temperatures may not give realistic results for some liners.

The test method selected for this project closely paralleled the NSF immersion procedure, including additional immersion periods. The NSF immersion procedure was best suited to the objective and number of samples of this project. The current EPA immersion test, Method 9090, was not written at the time the study began. However, the procedures in Method 9090 are essentially equivalent to the procedures used in this study. Consequently, it is anticipated that the data evaluation criteria from this project could be used for evaluating data from tests using Method 9090.

SECTION 4

TECHNICAL APPROACH

OBJECTIVES

The purpose of the project was to investigate the chemical resistance of flexible membrane liner materials using immersion tests. The results from this study will help liner users select the most appropriate liner for their waste containment application.

To accomplish this, the project had the following objectives:

- to expose liner materials to a range of chemicals typical of waste streams and challenging to the liner under controlled laboratory conditions
- to measure changes in the physical properties of these exposed liners
- to evaluate the liner material response (changes in physical properties) to determine the indicators of liner chemical resistance or non-resistance
- to determine, for each liner material, the basic material response and degree of response indicative of nonresistance so that the criteria can be applied to the evaluation of immersion test data for liner specimens in real waste (e.g., Method 9090 results)

PROJECT ADVISORY COMMITTEE

An advisory committee made up of individuals from academia, regulatory agencies, and industry was formed. The purpose of the advisory committee was to provide guidance on liner and chemical selection, test methods, and data interpretation. The advisory committee provided input through correspondence.

Individuals were selected for the advisory committee based on expressed interest in the project and known expertise in hazardous waste containment or treatment and FML technology. Thirty-four individuals were contacted, and twenty-nine agreed to participate. The names and affiliations of the participants are listed in Appendix A.

EXPERIMENTAL DESIGN

The project was divided into three parts: planning, testing, and reporting. The testing phase extended for twenty-eight months, and was divided into four sections (see a diagram of the testing in Figure 2). The four sections for the testing phase were initial screening tests, tests of unexposed (as-received) material properties, measurement of weight and dimension changes after long immersion periods, and measurement of changes in mechanical properties after immersion periods of 1, 7, 14, 28, 56 days and two years. Each section is described below:

- Initial Screen Tests. The initial screening tests were performed to aid in the selection of organic chemical concentrations for FML immersion tests. Coupons of FML materials were exposed to five concentrations of five organic chemicals (including pure solvents) for seven days at room temperature. Changes in weight, dimension and appearance were noted. The samples were allowed to air dry for another seven days. After drying, coupon weight and dimension were measured again.

  Results from these initial screening tests were evaluated and used to select organic concentrations for testing. The goal was to select the highest test concentration, one with sufficient chemical strength to produce measurable, but not catastrophic, changes in most of the liners within seven days. Two lower concentrations of incremental dilutions were then selected to give a total of three concentrations of organic chemicals for immersion.

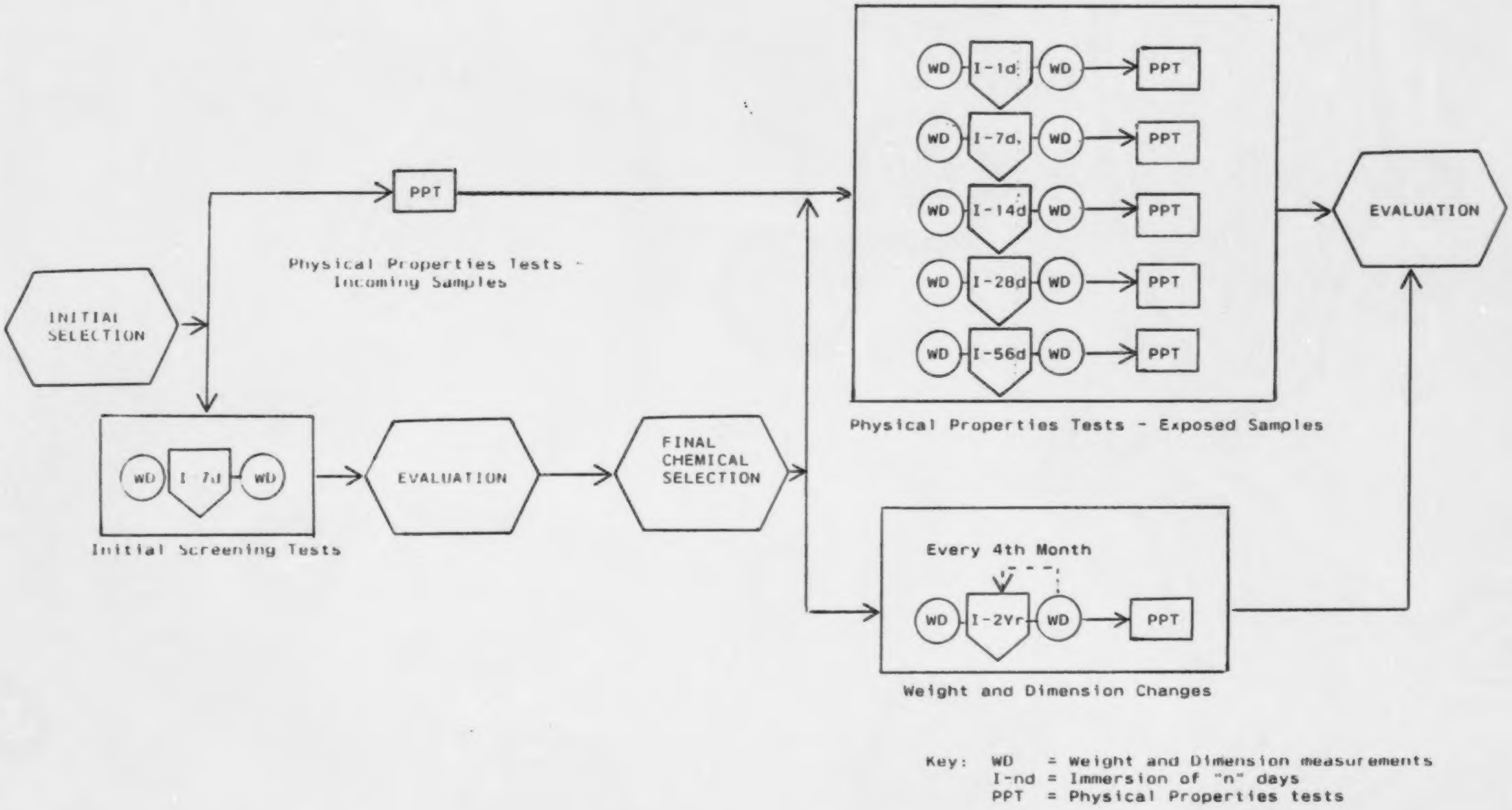

INITIAL SELECTION
PPT
Physical Properties Tests - Incoming Samples
WD
I-7d
WD
Initial Screening Tests
EVALUATION
FINAL CHEMICAL SELECTION
WD
I-1d
WD
PPT
WD
I-7d
WD
PPT
WD
I-14d
WD
PPT
WD
I-28d
WD
PPT
WD
I-56d
WD
PPT
Physical Properties Tests - Exposed Samples
Every 4th Month
WD
I-2Yr
WD
PPT
Weight and Dimension Changes
EVALUATION
Key: WD = Weight and Dimension measurements
I-nd = Immersion of "n" days
PPT = Physical Properties tests

Figure 2. Project diagram

]

- Unexposed Material Property Tests. As-received liner samples were tested against NSF Standard 54 (Flexible Membrane Liners) requirements (7). Results were compared both to the Standard 54 tables and to manufacturers' test results. The properties measured included, but were not limited to, the properties measured after chemical immersion (tensile properties and tear resistance).

  These as-received measurements served as a control and baseline for material changes after chemical immersion. They were also a quality assurance tool, showing that the liner material was of good manufacture, and that the test methods produced results within the expected range for the materials.

- Long-term Weight and Dimension Changes. Samples of each liner were immersed in all of the selected chemicals at all concentrations. Each sample (composed of three die-cut specimens) was measured for changes in weight and dimensions every four months for up to two years. The tensile strength and elongation of these weight and dimension specimens were measured at the end of the test period.

- Mechanical Property Changes. Coupons of all FMLs were immersed in all of the selected chemical exposures for periods of 1, 7, 14, 28, or 56 days. Two exposure temperatures were used: 23° and 50° Centigrade. Weight and dimension were measured before and after immersion, and percentage changes were calculated. Test specimens were die-cut from the coupons after exposure and tensile properties and tear resistance were also measured. Ten test specimens were cut for tensile properties testing (five in the machine direction and five in the transverse direction) and five specimens were cut for tear resistance testing.

SELECTION OF FMLs FOR TESTING

Selection Criteria

Six FML materials were used for immersion testing in this project. All materials used were donated by manufacturers. The criteria for FML selection were:

- to have at least one material from each of three polymer classifications; thermoplastic, crosslinked elastomer, and partially crystalline thermoplastic
- to choose material types that are in use in the field, based on the information in SW-870 "Lining of Waste Impoundment and Disposal Facilities" (10)
- to choose materials similar to those used in the U.S. Bureau of Reclamation (USBR) study of FML seam chemical resistance (19)
- to select liners so that, if possible, no manufacturer would provide more than one FML for testing

FMLs Selected

Table 5 lists the materials tested in this project. Six manufacturers provided material. Industrial grade chlorosulfonated polyethylene (CSPE-LW) replaced the potable grade CSPE initially selected. This change was made because the CSPE-LW better represented liner material used in waste containment applications (21).

All materials except epichlorohydrin (EPI-CO) were 30 mils thick (0.03 inch). Epichlorohydrin was not available in 30 mil thickness, and a 60 mil liner was used. The 30 mil thickness was chosen primarily to correspond to the liner thickness used in the USBR project.

Only unsupported FML liners were tested (material with no reinforcing scrim). It was decided that the chemical resistance of the scrim was not of primary concern and was beyond the scope of the study. Having a scrim present would be a complicating variable in the testing, and would have required much work to eliminate (that is, sealing all cut edges of samples to prevent contact between the solutions and the scrim). Immersion testing is an acclerated test procedure, not designed to simulate actual use conditions. Using scrim and flood coating edges adds variables which are hard to control, does not enhance the quality of the immersion data, and may only retard but not change the final results.

Table 5. FML MATERIALS SELECTED FOR CHEMICAL RESISTANCE TESTING

FML NAME	SYMBOL	THICKNESS (mils)
CROSSLINKED ELASTOMER:		
Ethylene Propylene Diene Monomer	EPDM	30
Epichlorohydrin	EPI-CO	60
THERMOPLASTICS:		
Polyvinyl Chloride	PVC	30
Chlorinated Polyethylene	CPE	30
PARTIALLY CRYSTALLINE:		
High Density Polyethylene	HDPE	30
UNVULCANIZED RUBBER:		
Chlorosulfonated Polyethylene (industrial grade)	CSPE-LW	30

Description of FMLs Received

Polyvinyl chloride (PVC)--is a thermoplastic polymer made by polymerizing vinyl chloride monomer, or vinyl chloride/vinyl acetate monomers. PVC is a rigid material, and to make flexible liners, plasticizers must be added (3). From 25 to 35 percent of plasticizers and 1 to 5 percent by weight of heat stabilizers are added to the liner formulation (7).

A medium grey 30 mil unsupported PVC liner was used. The liner had a smooth surface with no observable defects. The roll stock received was approximately five feet wide.

Chlorinated polyethylene (CPE),--a saturated polymer, is produced from a reaction between polyethylene and chlorine. The polymer contains 25-45 percent chlorine by weight and 0-25% crystallinity (3,7). An FML bearing the name CPE contains CPE resin as at least 50 percent of the total polymer content.

The CPE liner supplied was a 30 mil unsupported thermoplastic material on a five foot wide roll. It was charcoal grey with an embossed texture on one side. Tiny streaks of entrapped air were visible, randomly distributed throughout the liner. The manufacturer stated that these streaks are an effect of the manufacturing process, and would not effect immersion results (22).

Ethylene propylene diene monomer (EPDM)--is a synthetic elastomer terpolymer based on ethylene, propylene, and a third monomer of diene hydrocarbon that provides sites for crosslinking (3). EPDM liners are available in both thermoplastic and crosslinked (vulcanized) forms (7).

The EPDM liner used was a grey vulcanized liner of nominal 30 mil thickness. Actual thickness varied from 31 to 48 mils (average 40 mils). Seams occurred on the roll approximately every five feet, and were avoided when cutting test samples. The roll received was ten feet wide, and was cut into two five feet sections for storage (see Section 5).

Epichlorohydrin rubber (EPI-CO)--is a synthetic organic polymer made from epichlorohydrin (1-chloro 2,3-epoxypropane) (12). The polymer is a saturated polyether with chloromethyl side chains. Epichlorohydrin liners are generally vulcanized (3).

The EPI-CO liner received and tested was of nominal 60 mil thickness (30 mil was not available). The roll was ten feet wide; it was cut in two for storage. Seams occurred approximately every five feet and were avoided when obtaining test samples.

High density polyethylene (HDPE)--is a polymer prepared by low pressure polymerization of ethylene as the principal monomer. This material is partially crystalline in nature and is stiffer than other types of membrane materials. Two to three percent carbon black is added to improve ultraviolet light resistance (3).

A 30 mil black HDPE liner was used. The three rolls received were approximately five feet wide. The liner outside surface had shallow lengthwise calender marks, which were not considered a defect. Because of the relative stiffness of the roll stock, the liner retained a 'curve' from the roll when cut into samples.

Chlorosulfonated polyethylene - low water absorption (CSPE-LW)--is a specific formulation of CSPE. This polymer is made by a reaction between polyethylene and chlorine and sulfur dioxide. FMLs contain 24 to 43 percent chlorine and 1 to 1.4 percent sulfur by weight (7). There are two grades of liner produced: potable (also called standard) and low-water absorption (also called industrial). The two grades have significantly different properties, and the low water absorption grade (CSPE-LW) is more suitable for waste containment applications (20). Most CSPE and CSPE-LW liners are supplied as thermoplastics, but the liner crosslinks with time in response to heat, moisture, and light (3). These liners are usually reinforced with a scrim to improve strength and temperature-related properties.

A 30 mil unsupported CSPE-LW liner was used. The liner was black rubber with a smooth surface similar to rainboots, and had no observable defects. The roll was approximately five feet wide with no seams.

FML "As Received" Properties

The six flexible membranes selected for exposures were tested for selected physical properties by NSF and by the manufacturer that provided the material. NSF presented results to each manufacturer prior to seeing the manufacturers' results. There were three objectives for this testing: 1) to establish that the materials used in this study met the physical properties requirements in NSF Standard 54; 2) to establish comparability of test methodology between NSF and the manufacturers; and 3) to provide interlaboratory QC results. The results are presented in Tables 6-11.

All materials met the requirements of the current NSF Standard 54 where applicable. Unsupported 30 mil chlorosulfonated polyethylene (CSPE-LW) is not covered under Standard 54 and could not be compared to it. The HDPE results were reviewed by the manufacturer, but manufacturer test results for this sample were not available for comparison.

Two properties differed consistently from manufacturers' results. The first was tear resistance. In three out of the four cases where manufacturer's data was available, NSF's value for tear resistance was lower than the manufacturer's value. Average difference was two and one half pounds. Three of these five materials were tested in round robin testing with the U.S. Bureau of Reclamation (USBR). Tear resistance values were very close, NSF's results averaging one half pound higher.

Table 6. AS RECEIVED PROPERTIES: 30 MIL POLYVINYLCHLORIDE (PVC)

PROPERTY	NSF RESULTS	MANUF. RESULTS	STANDARD 54 SPEC
THICKNESS (inches)	.0307	.0306	minimum .0285
SPECIFIC GRAVITY	1.26	1.26	minimum 1.20
DIMENSIONAL STABILITY (percent)			
Machine	-1.7	-1.7	maximum 5
Transverse	+0.9	+1.0	maximum 5
VOLATILE LOSS (percent)	0.48	0.61	maximum 0.7
HARDNESS	90	93	N.R.[1]
TENSILE PROPERTIES BREAKING FACTOR (pounds/inch width)			
Machine	88.3	90.6	minimum 69
Transverse	84.6	84.2	minimum 69
ELONGATION AT BREAK (percent)			
Machine	449.6	480	minimum 300
Transverse	462.6	475	
S-100 MODULUS (pounds/inch width)			
Machine	50.8	46.4	minimum 27
Transverse	47.3	43.7	
TEAR RESISTANCE (pounds)			
Machine	10.6	12.1	minimum 8
Transverse	10.5	13.4	

---

[1] N.R. = Not required

Table 7. AS RECEIVED PROPERTIES: 30 MIL CHLORINATED POLYETHYLENE (CPE)

PROPERTY	NSF RESULTS	MANUF. RESULTS	STANDARD 54 SPEC
THICKNESS (inches)	.0296	.0298	minimum .0285
SPECIFIC GRAVITY	1.358	1.350	minimum 1.20
DIMENSIONAL STABILITY (percent)			
Machine	-8.0	-6.8	maximum 16
Transverse	+1.9	+0.6	maximum 16
VOLATILE LOSS (percent)	0.45	0.30	maximum 0.5
TENSILE PROPERTIES BREAKING FACTOR (pounds/inch width)			
Machine	54.2	56.9	minimum 43
Transverse	47.9	46.9	
ELONGATION AT BREAK (percent)			
Machine	437	346	minimum 300
Transverse	609	458	
S-100-MODULUS (pounds/inch width)			
Machine	37.6	29.9	minimum 12
Transverse	17.9	15.4	
TEAR RESISTANCE (pounds)			
Machine	7.54	8.49	minimum 4.5
Transverse	6.12	7.99	

Table 8. AS RECEIVED PROPERTIES: 30 MIL ETHYLENE PROPYLENE DIENE MONOMER (EPDM)

PROPERTY	NSF RESULTS	MANUF. RESULTS	STANDARD 54 SPEC
THICKNESS (inches)	.0404	---	minimum .027
SPECIFIC GRAVITY	1.165	1.18	1.18 ± .03
DIMENSIONAL STABILITY (percent)			
Machine	-0.8	---	maximum 2
Transverse	-0.1	---	maximum 2
VOLATILE LOSS (percent)	.480	---	N.R.[1]
HARDNESS Durometer A	59	62	60± 10
TENSILE PROPERTIES BREAKING FACTOR (pounds/inch width)			
Machine	63.4	51.0*	minimum 42
Transverse	68.9	---	minimum 42
ELONGATION AT BREAK (percent)			
Machine	401.8	420*	minimum 300
Transverse	395.0	---	minimum 300
TEAR RESISTANCE (pounds)			
Machine	8.9	6.8	minimum 4
Transverse	9.0	---	

---

[1] N.R. = Not required

* A one-inch wide specimen was tested

Table 9. AS RECEIVED PROPERTIES: 60 MIL EPICHLOROHYDRIN (EPI-CO)

PROPERTY	NSF RESULTS	MANUF. RESULTS	STANDARD 54 SPEC
THICKNESS (inches)	.0587	.062	minimum .054
SPECIFIC GRAVITY	1.51	1.515	1.49 ± .06
DIMENSIONAL STABILITY (percent)			
Machine	-.10	---	maximum 2
Transverse	-.10	---	maximum 2
VOLATILE LOSS (percent)	0.014	---	N.R.[1]
HARDNESS Durometer A	73	73	70± 8
TENSILE PROPERTIES BREAKING FACTOR (pounds/inch width)			
Machine	96.4	120.96	minimum 90
Transverse	104.7	---	minimum 90
ELONGATION AT BREAK (percent)			
Machine	302.0	340.0	minimum 210
Transverse	312.3	---	minimum 210
TEAR RESISTANCE (pounds)			
Machine	13.0	16.0	minimum 8
Transverse	14.1	---	minimum 8

---

[1] N.R. = Not required

Table 10. AS RECEIVED PROPERTIES: 30 MIL HIGH DENSITY POLYETHYLENE (HDPE)

PROPERTY	NSF RESULTS	MANUF. RESULTS	STANDARD 54 SPEC
THICKNESS (inches)	.0295	---	minimum .030
SPECIFIC GRAVITY	.9507	---	minimum .940
DIMENSIONAL STABILITY (percent)			
Machine	+1.12	---	maximum ± 3
Transverse	-1.63	---	
VOLATILE LOSS (percent)	-0.18	---	N.R.[1]
TENSILE PROPERTIES BREAKING FACTOR (pounds/inch width)			
Machine	153.1	---	minimum 90
Transverse	162.7	---	---
ELONGATION AT BREAK (percent)			
Machine	647.3	750[2]	minimum 500
Transverse	663.2	---	---
YIELD STRESS (pounds/inch width)			
Machine	84.0	---	minimum 50
Transverse	92.5	---	---
ELONGATION AT YIELD (percent)			
Machine	9.5	13[2]	minimum 10
Transverse	8.4	---	---
MODULUS OF ELASTICITY (pounds per square inch)			
Machine	64,000	110,000[2]	minimum 80,000
Transverse	65,000	---	---
TEAR RESISTANCE (pounds)			
Machine	26.2	---	---
Transverse	27.1	---	---

[1] N.R. = Not required

[2] The manufacturer was unable to give as received properties. These values were given by the manufacturer as typical for this material. It is unknown whether this data is for the machine or transverse direction.

Table 11. **AS RECEIVED PROPERTIES: 30 MIL CHLOROSULFONATED POLYETHYLENE (CSPE-LW)**

PROPERTY	NSF RESULTS	MANUF. RESULTS[2]	STANDARD 54 SPEC[1]
THICKNESS (inches)	.0306	---	---
SPECIFIC GRAVITY	---	---	---
DIMENSIONAL STABILITY (percent)			
Machine	---	---	---
Transverse	---	---	---
VOLATILE LOSS (percent)	---	---	---
HARDNESS Durometer A	---	---	---
TENSILE PROPERTIES BREAKING FACTOR (pounds/inch width)			
Machine	49.0	---	---
Transverse	40.0	---	---
ELONGATION AT BREAK (percent)			
Machine	211	---	---
Transverse	304	---	---
TEAR RESISTANCE (pounds)			
Machine	12.7	---	---
Transverse	10.2	---	---

---

[1] There are no NSF Standard 54 Specifications for unsupported material (without scrim).

[2] Manufacturer did not provide as received properties.

While a slight difference in method may have caused the consistently lower values, NSF's tear resistance results in general are very consistent, and within reasonable error bounds.

The second property which differed was S-100 modulus. A measure of the tensile stress at 100 percent elongation, this property depends on the accuracy of both load and elongation measurements. NSF's value for S-100 was higher than the manufacturer's for both CPE and PVC. Conversations with the manufacturers indicated that one cause may have been a difference in the initial strain rate when testing. Again, S-100 modulus results at NSF are consistent and within reasonable error bounds.

This consistency means that when significant differences do occur in testing results for chemical exposures, the relative change will be a real indication of a change in the material, even though the absolute values may be slightly different from the manufacturer's data. The relative change is a principal criteria for evaluation of data.

SELECTION OF IMMERSION CHEMICALS

Criteria for Selection of Chemicals

Twenty chemical immersion solutions using nine chemicals and water were used for FML chemical resistance testing. The goal in selecting the chemical types was to have a broad range of chemicals that may be found in hazardous waste streams. A 'typical' waste is impossible to identify or produce. A project goal was to study the liner response to chemical challenge and relate that to other published data, therefore solutions of one chemical in water were chosen as opposed to chemical mixtures. Manufacturer and published data for single chemicals are available.

Types of chemicals such as acid, base, salt, ketone, and aldehyde, were considered. The final selection of chemicals was chosen using advisory committee comments, and attempted to parallel the study of FML seams being done by the USBR (EPA Interagency Agreement No. DW 14930547-01-2). Chemicals and concentrations were also selected to assure a broad range of material response to immersion. The broad range of material response (e.g., change in property) would assure that responses indicative of chemically resistant and non-resistant behavior were measured in the study.

Seven Day Screening

The chemicals and concentrations used for seven-day screening tests are listed in Table 12.

Table 12. INITIAL SCREENING CHEMICALS AND CONCENTRATIONS

Chemicals	Concentration (wt %)
Water	distilled
Furfural	1, 5, saturated (app 8.3), 100
Phenol	1, 5, saturated (app 8.3), 100
MEK	1, 10, saturated (app 26), 99
1,2-Dichloroethane	0.1, 0.5, saturated (app 0.8), 100
ASTM #2 oil	saturated (<.1), 100%

The purpose of the screening tests was to choose the maximum concentrations of organic chemicals to use in further testing. A concentration that produced a measurable change in the samples during a seven-day exposure without destroying them was sought.

The samples were weighed and dimensioned before exposure, immediately after seven days exposure, and again after seven days air drying. These results are presented in Appendix B.

The data show the percent change in weight and volume for increasing concentration of chemicals up to the saturation point. The exception is for ASTM #2 oil, which shows only the saturation and 100% concentration. Volume was computed from thickness, width and length measurements.

Chemicals Selected

The chemicals used for immersion testing, including water, are shown in Table 13. The concentrations used were chosen based on seven-day screening tests results, predicted ease of handling, and comparability to USBR immersion chemicals.

Table 13. CHEMICAL IMMERSION SOLUTIONS SELECTED FOR FML IMMERSION TESTS#

Name	Formula	Type	Concentrations (percent wt:wt)
Water	H_2O	Control	100
Hydrochloric Acid	HCl	Acid	10
Sodium Hydroxide	$NaOH$	Base	10
Sodium Chloride	$NaCl$	Salt	10, sat'd (app 35)
Potassium Dichromate	$K_2Cr_2O_7$	Oxidizer	10
Phenol	C_6H_5OH	Phenol	1,4, sat'd (app 8)
Furfural	C_4H_3OCHO	Aldehyde	1,4, sat'd (app 8)
Methyl Ethyl Ketone	$CH_3COC_2H_5$	Ketone	3,13, sat'd (app 26)
1,2-Dichloroethane	$Cl(CH_2)_2Cl$	Chlorinated-Hydrocarbon	0.1, 0.5, sat'd (app 0.8)
ASTM #2 Oil	--	Oil	100%, Sat'd (water with oil stirred in)

All chemicals were technical grade quality or better per ASTM D543 (9).

* An 8% solution of methyl ethyl ketone was used in place of the sat'd solution for CPE testing (see Section 8).

FML samples for seven-day screening tests consisted of three one-inch by five-inch coupons. Coupons were measured and weighed according to procedure FML-1 (see Appendix C) and hung in the immersion solutions. The immersion was conducted at room temperature (23° ± 2°C). After immersion, the samples were blotted on paper towels to remove adhering liquid and put into a labeled polyethylene bag. The samples were reweighed and measured the same day and then air-dried by hanging in open jars for seven days. The dried samples were then weighed and measured once more.

In water solutions of furfural at or less than saturation, all materials gained weight (1 to 25%). Some of this weight gain disappeared after seven days of air drying. Samples exposed to pure furfural gained up to 80% in weight. No materials were destroyed by furfural.

In solutions of 1,2-dichloroethane up to the saturation limit, the samples gained from 1 to 25% in weight. These weight gains were reversible, as the materials returned to within 5% of their original weight after the seven-day air drying. In pure 1,2-dichloroethane, three materials swelled severely: CSPE increased 124% in weight, PVC increased 464%, and CPE could not be measured because it came apart into many soft pieces. All five of the materials showed shrinkage and weight loss after seven days of air drying.

In solutions of MEK at or below saturation, all materials gained weight, up to 200%. Again, the weight gain was reversible - all samples but one returned to within 1% of their original weight after air drying. In 99% MEK, HDPE showed a slight weight gain, EPDM lost weight and became smaller and stiffer, and CSPE gained weight during immersion but after drying showed a weight loss. Both CPE and PVC showed severe swelling and loss of strength. No measurements were possible on these two materials.

In phenol in water up to the saturation limit, all materials gained weight, none more than 27%. Some of this gain disappeared during drying. One material, PVC, shrank slightly and lost weight when exposed to phenol-saturated water. For phenol at approximately 88% concentration, two materials lost weight and two gained. One showed no change. Maximum weight change was 43%, and no materials were destroyed.

In ASTM #2 oil-saturated water, the maximum weight change was under 3%. In pure #2 oil, only EPDM showed a significant change in weight. It gained 40% in weight during the seven-day immersion.

A comparison of results for samples immediately after immersion and after a seven-day drying period are also interesting. Some materials weigh less than their original weight after drying, indicating membrane material loss. The material lost is probably additives, but could possibly be polymer degradation. For most samples showing weight loss after seven days of drying, there has been a relatively large volume increase (swelling) during immersion. The swelling could make additive dissolution easier. Swelling may also indicate crosslink bond-breaking.

The three concentrations of organic solvents selected were the saturation limit in water as a maximum, 50 percent of that saturation limit, and a lower concentration of 10 to 15 percent of the maximum which was easy to maintain and measure. The absolute concentration of the immersion solution was not as critical to evaluation of the data as was the demonstrable difference of response of the material to immersion in the different concentrations.

A brine solution of sodium chloride was used at 10 and 35 percent by weight. Hydrochloric acid, sodium hydroxide, and potassium dichromate solutions were all 10 percent by weight. All chemicals used were technical grade quality or better per ASTM D543(9). Brief descriptions of the chemicals used follow.

- Water--Both the water for water immersion tests and the water used for the organic chemical solutions were lightly buffered in order to provide pH control and ionic strength. Sodium bicarbonate and calcium chloride were used to a level of 100 mg/L hardness as $CaCO_3$ and to provide a pH of 8.3 ± 0.5.

- **Furfural**--Furfural is an aldehyde derived from oat hulls, rice hulls, or corn cobs by steam-acid digestion. It has a sweetish odor and is an amber or straw-colored liquid at room temperature. Some uses are: solvent refining of lubricating oils and other organic materials; solvent for nitro-cellulose; wetting agent; weed killer; production of lysine; road construction; flavoring (20).

- **Hydrochloric acid**--Hydrochloric acid is a strong, highly corrosive acid. It is commonly used in oil well acidification, chemical synthesis, ore reduction, food processing, and pickling and metal cleaning (20).

- **Sodium Hydroxide**--Sodium hydroxide is an important commercial caustic. Some uses are: manufacturing of other chemicals; oil refining; aluminum processing; pulp and paper; soap; textile processing; reclaiming rubber (20).

- **Potassium Dichromate**--Potassium dichromate is a poisonous, bright orange salt, and is used as an oxidizing agent in chemical synthesis. It is also used in brass pickling, electroplating, explosives, adhesives, wood stains, photography and lithography, and pigments (20).

- **Sodium Chloride**--Sodium chloride is the most common salt. Used widely in chemical manufacturing, metallurgy, refrigeration, glass, food preservation, soap production, and for ice control on streets and runways (20).

- **ASTM No.2 Oil**--This is a petroleum based thick oil with an aniline point of 93 ± 3°C. This oil is used as a reference oil to evaluate the chemical resistance of rubbers per ASTM Method D471 (21).

- **Methyl Ethyl Ketone**--MEK is a colorless, volatile, flammable ketone. Some of the many uses are: organic chemical synthesis; lacquers; dewaxing of lubricating oils; paint removers; adhesives; and printing (20).

- **Phenol**--Phenol is one of the most important organic chemicals. Phenol is a solid at room temperature, and is colorless when very pure, but turns pinkish with impurity on exposure to light. Phenol is used to make phenolic resins, epoxy resins, herbicides, adipic acid, salicylic acid, picric acid, germicidal paints, and many pharmaceuticals (20).

- **1,2-Dichloroethane**--1,2-Dichloroethane is also known as ethylene dichloride. It is a colorless, oily liquid with a chloroform-like odor and is used as a solvent for fats, oils, waxes, rubber, and gums. Other uses are: oil extraction; dry cleaning; paint and varnish removers; metal degreasing; wetting agents; organic synthesis (20).

TEST EQUIPMENT

Immersion Jars

Immersion of FML sample coupons in chemical solutions was done in glass jars. Glass was chosen because of its resistance to the wide range of chemicals being tested, transparency (to allow inspection of sample condition), and low cost.

For long-term immersions, one quart canning jars were used. A screw on cap lined with polyethylene was used to control evaporative loss from the jars.

For shorter immersions (up to 56 days), two gallon apothecary jars were used. Apothecary jars were sealed with rope caulking between the glass lid and the jar. Jars containing solutions of volatile chemicals were also taped with a stretchable heat and moisture-resistant transparent tape to reduce evaporative loss. A picture of one quart and two gallon immersion jars is shown in Figure 3.

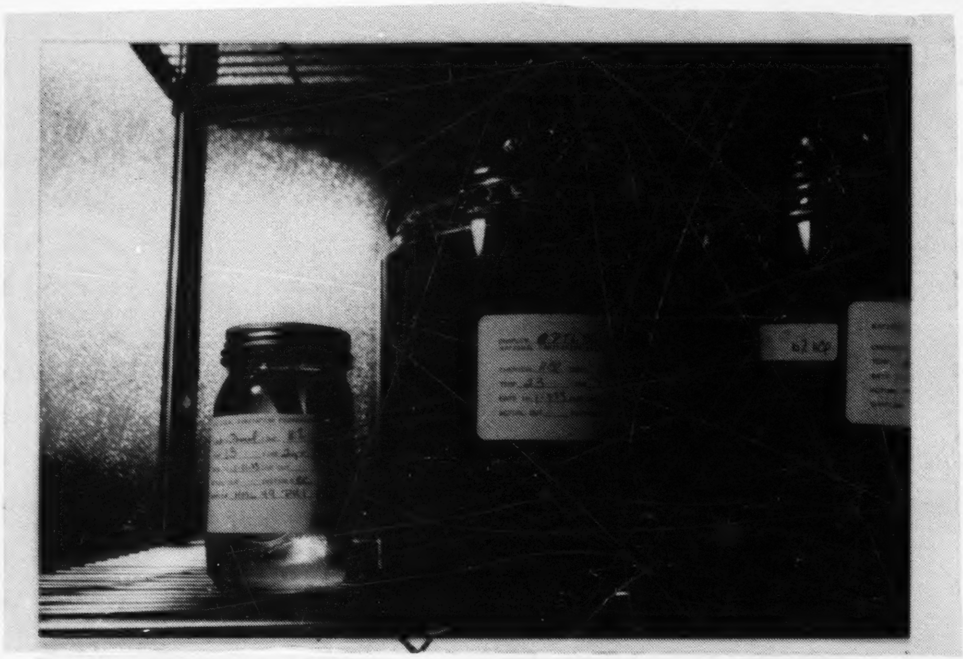


Figure 3. One quart and two gallon immersion jars

For the shorter immersions, a total of 1600 two gallon immersions were carried out corresponding to 20 combinations of chemical concentrations, two temperatures, six exposure periods, six materials, plus triplicates for two materials at one temperature (the testing was staggered so that 1600 jars were not needed). For each of the 1600 immersions, five tensile specimens and five tear specimens each in the machine and transverse directions were generated. Tensile properties and tear resistance are reported as means of five specimens.

The long-term immersion consisted of 240 quart jars (six materials, two temperatures, and 20 combinations of chemical concentrations). In each jar, there were three 1" x 3" specimens cut in the machine direction. From these specimens weight and dimension changes were measured over a two year period. Tensile properties were measured from the 1" x 3" coupons at the end of two years. Weight, dimension data, and the final tensile properties from the long-term immersion are reported as means of three specimens.

The FML materials were suspended in solution with teflon "spaghetti" tubing (0.016 inch diameter). Holes were punched in the top of the liner, the tubing threaded through the holes and taped on the outside of the jars. The tubing did not interfere with closing the lids on the jars.

Long-term immersion coupons were measured in triplicate for weight and dimension changes at four-month intervals and replaced in solution. To maintain coupon identity, each of the three triplicates was marked by clipping 1) two corners, 2) one corner, and 3) no corner of the coupon.

Weight and Dimension Tools

A Mettler A30 balance was used for weighing the 1" x 3" sample coupons. Weight was recorded to within 0.0001 gram.

A Federal 691B deadweight dial micrometer was used to measure thickness. The micrometer was modified to provide a 2" diameter anvil and a seven ounce weight was used to give a pressure of 3.8 psi. This method modification increases accuracy for materials softened by immersion. Thickness was measured to 0.0001 inch (0.1 mil).

Standard dial calipers were used to measure the width and length of the test coupons to the nearest 0.001 inch (1 mil).

Die Punch

A pneumatic punch press (NAEF Model P/44) was selected for cutting FML test specimens. This punch uses precision dies specified in ASTM test methods (18). Dies included a 1"x 4", 1"x 6", and 1"x 3" straight edge, an ASTM D638 type IV dumbell, a D412 dumbell, and a D624 tear. Dies were sharpened by the die manufacturer as needed.

Test Chambers

Immersion jars were stored in one of two ventilated test chambers for the specified immersion periods. The chambers are insulated walk-in units with steel wire shelving for the immersion jars. Liquid temperature was maintained at 23 ± 2° and 50 ± 2° C in the two chambers.

Liquid temperature was monitored daily by recording the temperature of water in jars placed on the top and bottom shelves in each chamber.

Universal Test Machine

Mechanical properties were measured using a Unite-O-Matic 20,000 pound frame universal tester made by United Testing Systems. Load cells of 100 and 1000 pounds capacity provided the correct range of force measurement for FML testing. Elongation was measured by grip separation, using a crosshead motion detector.

Load and elongation data were collected with the Data-Matic data acquisition and reporting computer. Load data precision was 0.0125 percent of full scale (for example, .125 lb for a 1000 lb cell) and load cell accuracy was within 0.1 percent of full scale. Elongation precision was 0.01 inch.

Air-actuated grips were used to hold test specimens for tear and tensile testing. Air-actuated grips were chosen because they apply a constant and uniform pressure during the test, minimizing the potential for specimens to slip. Also, the applied pressure can be controlled and reproduced from sample to sample.

Smooth, hard rubber was used on one grip face, with smooth metal on the other. Both a one-inch square grip face and a one by three inch grip face were used.

Data Handling

The sample coding system is shown in Figure 4. Each sample was assigned a seven-part sample number that identified both the material and the chemical exposure conditions. For example, 'PL280P2' represents PVC ('P') tested after exposure at 23°C ('L') for 28 days in 100% ASTM No. 2 Oil ('O'), at 100 percent concentration ('P'). This sample is the second of three replicates ('2'). Test data taken in the machine direction is identified as '[property]M', for example 'Tear Resistance M', and that in the transverse direction as 'T'. The weight and dimension data corresponding to a sample number represents the average of three specimens while tensile properties and tear resistance data are averages of 5 specimens.

Project data was stored in a database using the DATATRIEVE data sorting and reporting software on NSF's VAX 11-750 computer. The sample code number allowed data to be sorted by any parameter (for example, temperature) and reported or graphed. Test scheduling and sample tracking and labeling were also assisted by using the computer database.

Figure 4. Sample Coding System

1 - 2 - 3 - 4 - 5 - 6

1 = Material
C = CPE
E = EPDM
Q = CSPE-LW
P = PVC
L = EPI-CO
H = HDPE

2 = Temperature
L = 23° C
H = 50° C

3 = Time
1 = 1 Day
7 = 7 Days
14 = 14 Days
28 = 28 Days
56 = 56 Days
99 = 2 Years

4 = Chemical
A = Hydrochloric Acid
B = Sodium Hydroxide
D = 1,2 Dichloroethan
F = Furfural
M = Methyl Ethyl Ketone
O = ASTM #2 Oil
P = Phenol
S = Sodium chloride
W = Buffered Water
X = Potassium Dichromate

5 = Concentration
L = Low
M = Medium
H = High
P = Pure

Note: For chemicals with only one concentration "M" was used.

6 = Replication*

* For samples in the two-year immersion study, replication refers to the testing period. For instance, "0" would mean an initial measurement, "1" refers to a measurement after the first month of immersion, "2" would refer to 4 months of immersion. For numbers greater than "2", the replication number would reflect four month intervals, A "3" would represent 8 months, etc. For EPDM and PVC in the short-term study, replication number refers to the triplicate samples.

Data Evaluation

The goal in data evaluation was to measure the response of a given FML material to a chemical challenge as a function of time, temperature, and concentration, and to evaluate the significance of this response in terms of liner chemical resistance. The tools used in making this evaluation were:

- comparison of data to previous work (manufacturers' resistance tables, EPA projects, literature)

- comparison of data to 'benchmarks' to measure extent of change (tests of unexposed liner samples and liner samples exposed to water, Standard 54 tables of minimum acceptable as-received properties)

- comparison of data to predictions from theory (solubility parameters)

- statistical analysis of data to determine statistical significance of changes, trends and stabilization.

SECTION 5

TEST PROCEDURES

MATERIAL STORAGE AND SAMPLE TRACKING

Rolls of FML material received from suppliers were assigned a material code that was part of the project sample coding system. The roll of material was tagged with the material code, the supplier, and the project number. The rolls of liner were stored on a rack built to hold six rolls up to six feet wide (see Figure 5). The rack eliminated concern for liner damage during storage.

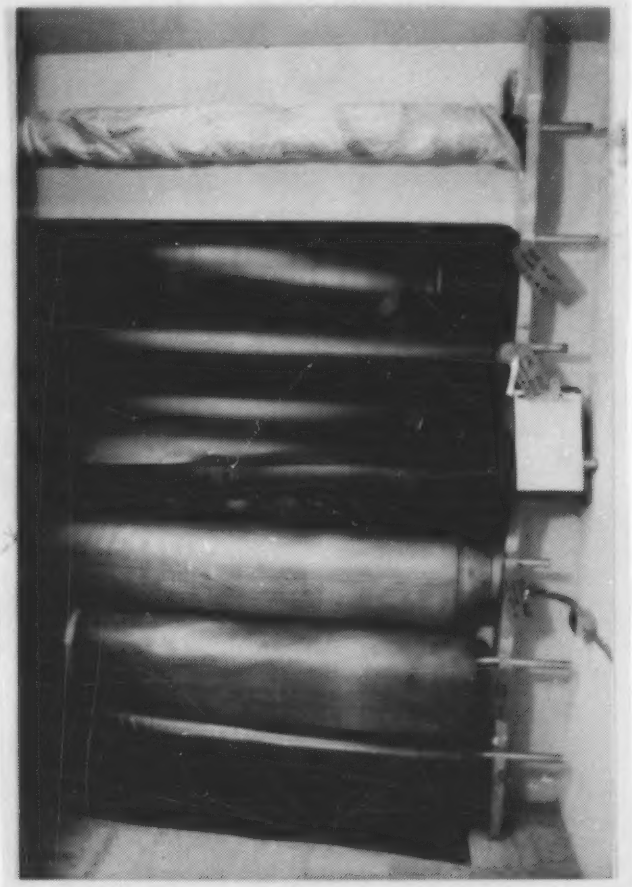


Figure 5. FML material storage

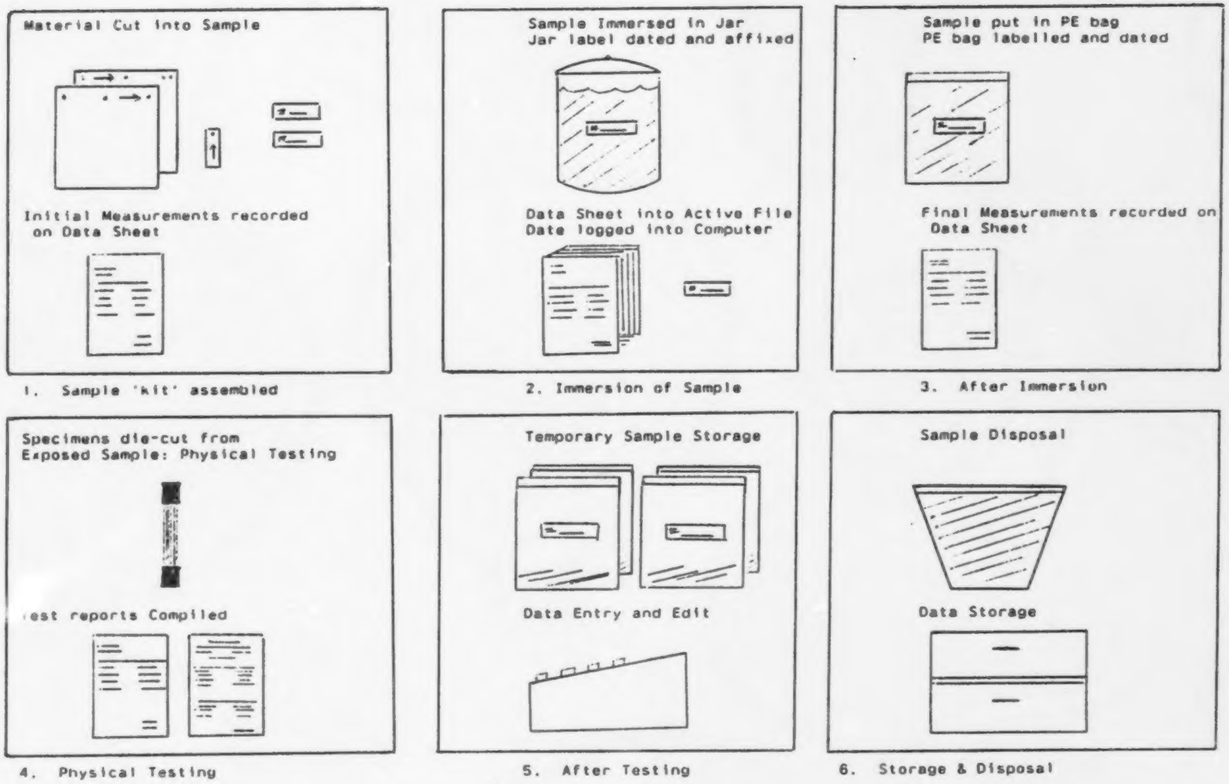
As the liner material was cut from the roll to be divided up into test samples, it was put into a box labeled with the material code. All pieces cut from the roll were marked with the grain direction (machine or transverse) as they were cut.

The sample tracking system is shown in Figure 6. A sample number was assigned to a group of specimens (one sample) as the initial weight and dimension measurements were taken. Two adhesive labels (preprinted with the sample number and necessary tracking information) became part of the 'sample kit' along with the data sheet. When the sample was immersed in a chemical solution ('on test'), the first label was put onto the exposure jar, showing the date in and the scheduled date out. The immersion date for the sample was then logged into the computed database. When the sample was removed from the exposure solution ('off exposure'), it was put into a sealable polyethylene bag until testing was completed. The second preprinted label was put onto this bag, showing the date removed from solution.

Remains of tested sample were kept in these labeled bags and stored until all the samples for that chemical type had been completed. Weight and dimension results were combined with mechanical test reports and entered into the computer database. The database provided the sample masterlog. When the entire sample group (one chemical exposure for all FMLs) had been tested, the data was edited to correct any errors in computer entries.

SAMPLE PREPARATION

Samples of each FML were cut for chemical immersion. The two-year immersion samples (three one-inch by three-inch coupons) were cut with the long side parallel to the machine direction. The shorter-term samples, for mechanical property testing, consisted of three coupons: two were approximately eight by eight and one-half inches in size, and the third was the same as the two-year samples. This small coupon was used as the indicator for weight and dimensional changes; and the larger coupons were used to cut specimens for mechanical property changes after immersions of up to 56 days.


Material Cut into Sample
Initial Measurements recorded on Data Sheet
Sample Immersed in Jar
Jar label dated and affixed
Data Sheet into Active File
Date logged into Computer
Sample put in PE bag
PE bag labelled and dated
Final Measurements recorded on Data Sheet
Specimens die-cut from
Exposed Sample: Physical Testing
Test reports Compiled
Temporary Sample Storage
Data Entry and Edit
Sample Disposal
Data Storage

1. Sample 'kit' assembled
2. Immersion of Sample
3. After Immersion
4. Physical Testing
5. After Testing
6. Storage & Disposal

Figure 6. Sample tracking system

All of the small die-cut specimens were weighed and measured for thickness, width, and length prior to immersion according to NSF procedure FML-1 (Appendix C). Small holes were punched in the top of the small specimen, and corner holes were punched into the large coupons.

IMMERSION PROCEDURE

Quart mason jars were used for the two-year immersion samples, and two-gallon glass apothecary jars were used for the larger samples (shorter term samples).

All immersions were conducted with a liner surface-to-volume ratio of approximately 40 milliliters per square inch of liner surface area. The surface to volume ratio was specified for consistency and to assure that the amount of solvent present in solution would not be limiting (e.g., concentration would remain relatively constant). Immersions were incubated at two temperatures, 23° and 50°C. Chemical solutions were mixed in the immersion jars. Solution preparation was done on the same day as immersion for volatile solutions, and on the same day or the day before for non-volatile solutions.

Teflon cord (0.016 inch) was threaded through the holes and the samples were lowered into the immersion jars.

Rope caulk was put around the edges of the apothecary jar lip before the glass lid was put on to help seal the jar. Jars of volatile solutions were also taped with heat- and moisture-resistant adhesive tape to reduce evaporative loss.

Immersion jars were placed in controlled temperature chambers. Jars were set on open wire shelving to allow air circulation for temperature control. The temperature of jars of water in the chambers placed on top and bottom shelves were measured twice daily (± 2°C tolerance each).

After the specified length of immersion time, sample jars were removed from the incubation chambers and samples removed. Low temperature samples were removed from the solutions, blotted, and cleaned with soap and water and/or rinsed, if necessary (e.g., oily exposures, acid and basic solutions), and placed in plastic bags. High temperature samples were reimmersed in a 23°C solution of the same composition for at least one hour before bagging per ASTM D543 (18). The small coupons were weighed and dimensioned. Two-year immersion coupons were then returned to a fresh solution of chemical for continued exposure.

Tear resistance and tensile property specimens were cut from the larger of the short-term samples. Five of each type were cut in both the machine direction and the transverse direction. Figure 7 shows a typical cutting pattern for an elastomeric FML sample. Thermoplastic FML samples were cut similarly, except instead of the 'dogbone' tensile bars, straight one-inch by four-inch tensile bars were cut. The tensile properties; S-100 modulus, breaking factor, elongation at break, and tear resistance tests were performed on the samples. ASTM methods appropriate to the type of liner material were used, specifying specimen shapes and test conditions. Table 14 lists the physical properties tests performed on exposed liner materials.

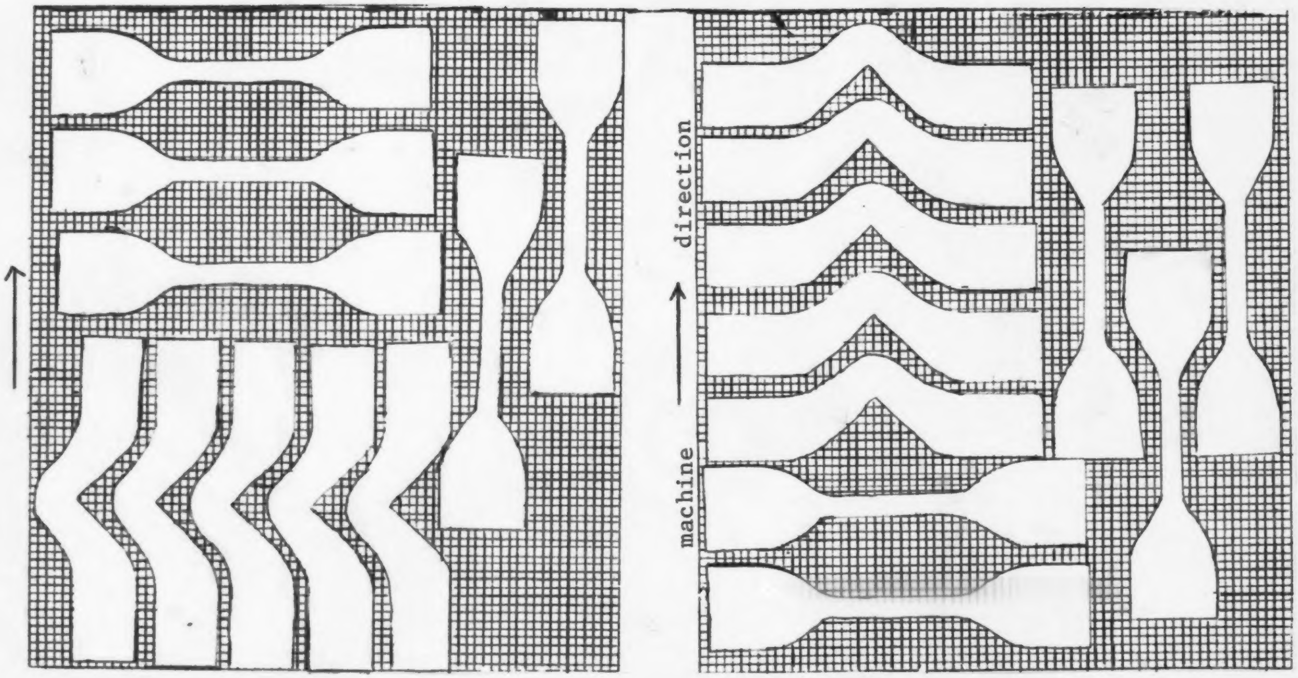

machine direction

Figure 7. Pattern for typical immersion sample die cutting

Table 14. PHYSICAL PROPERTIES TESTS FOR IMMERSION SAMPLES

LINER TYPES	TESTS REQUIRED	NO. SPECIMENS	METHODS
Elastomers	Breaking Factor (lb/inch width) Elongation at Break (inch)	10*	ASTM D412 die C
	Tear Resistance (lb)	10*	ASTM D624 die C
	Weight and Dimension	3	NSF method FML-1
Partially Crystalline	Breaking Factor (lb/inch width) Yield Strength (lb/inch width) Elongation at Break (inch) Elongation at Yield (inch) Modulus of Elasticity (psi)	10*	ASTM D638 type IV
	Tear Resistance (lb)	10*	ASTM D1004 die C
	Weight and Dimension	3	NSF method FML-1
Thermoplastic	Breaking Factor (lb/inch width) Elongation at Break (inch) S-100 Modulus (lb/inch width)	10*	ASTM D882 die 1" x 4"
	Tear Resistance (lb)	10*	ASTM D624 die C
	Weight and Dimension	3	NSF method FML-1

* Five each in the machine and transverse direction of cut

SECTION 6

QUALITY CONTROL

MEASUREMENT OBJECTIVES

Quality assurance objectives for precision, accuracy, and completeness for the physical properties testing parameters required for this project are given in Table 15. The load cells used in these measurements are accurate to within one tenth of one percent of the load cell capacity.

Round-robin testing conducted with the United States Bureau of Reclamation (USBR) and with the manufacturers supplying the liner materials were used to gauge accuracy of NSF's physical properties measurement, and interlab reproducibility of the methods.

Completeness refers to NSF objectives in number of tests carried to completion of all those begun. Reasons for inability to complete tests were documented and every attempt made to retest. The completeness target for the project was 95%. For physical properties testing after chemical exposure, if a sample was degraded to the degree that testing was impossible, the test will still be considered completed.

A system of replication was used for physical properties testing to determine experimental precision and material varability. Three separate samples of PVC and EPDM were exposed and tested for the conditions shown in Table 16.

Representativeness of portions of liner material used for immersion testing was established by visual inspection before and after cutting

TABLE 15. QUALITY CONTROL OBJECTIVES FOR PHYSICAL PROPERTIES TESTS

TEST DESCRIPTION	REFERENCE	ACCURACY	PRECISION	COMPLETENESS
Tensile Properties	ASTM D638 ASTM D882 ASTM D4	(a)	± 10%	95%
Tear Resistance	ASTM D624 ASTM D1004	(a)	± 10%	95%
Thickness	ASTM D374	1 mil	0.7 mil	95%
Weight	NSF Std. 54	1 mg.	0.9 mg.	95%
Dimension	NSF Std. 54	6 mil	6 mil	95%

(a) Load cells are accurate to 0.1% of capacity (e.g., 1 pound for a 1,000 pound load cell)

immersion speciments. Before cutting, the area to be cut was inspected to assure that there were no apparent material distortions or anomalies not representative of the entire material. After cutting, the specimen was inspected to assure that the cutting did not produce distortions or anomolies which are not representative of the entire material. Test results were used to compare the properties of liner materials before and after exposure to the simulated chemical wastes, and are expressed as percent change. Direct comparison of property changes between liners of different polymers is not valid.

TABLE 16. REPLICATION SYSTEM FOR PHYSICAL PROPERTIES TESTS

IMMERSION PARAMETER	TEST CONDITIONS	REPLICATION CONDITIONS
Temperature	23,50 Centigrade	23 Centigrade
Chemical Exposures	20	20
Length of Exposure	1,7,14,28,56 days	1,7,14,28,56 days
Number of Materials	6	2

WEIGHT AND DIMENSION

Calipers and balances were calibrated one time per day with premeasured blocks and weights traceable to the National Bureau of Standards. The primary source of variability in weight and dimension testing was measurement technique.

Technician training was conducted at the beginning of the project to assure consistency in measurement technique. Three technicians were asked to weigh and measure the same five coupons of five FML materials. Means and standard deviations for each technician are shown in Table 17. A two-way analysis of variance (ANOVA) was performed on each data set to determine if there were statistical differences between the mean result for each technician and whether there were statistical differences within the five coupons. A data set consisted of data from all three technicians for one FML material and one of the measurements -- weight or a dimension. The calculated F-values were compared to the tabulated F-values corresponding to 95 percent confidence and the appropriate degrees of freedom.

The coupons proved to be statistically the same for all materials and measurements. There were several areas where the three technician mean results were not statistically the same. These were the width, thickness and weight for EPI-CO and EPDM; the width and thickness for HDPE, and the width for CPE.

TABLE 17. MEANS AND STANDARD DEVIATIONS FOR EACH TECHNICIAN

Technician	Weight Mean (grams)	Weight Standard deviation	Thickness Mean (mil)	Thickness Standard deviation	Width Mean (inch)	Width Standard deviation	Length Mean (inch)	Length Standard deviation
HDPE								
2020	1.5619	0.00021	34.7	0.11	0.999	0.0005	3.002	0.0008
2080	1.5615	0.00017	34.1	0.08	1.000	0.0005	3.002	0.0005
2418	1.5616	0.00004	33.8	0.04	0.998	0.0012	3.002	0.0009
Overall	1.5617	0.00021	34.2	0.37	0.999	0.0011	3.002	0.0008
PVC								
2020	1.9034	0.00011	31.3	0.05	0.997	0.0008	2.996	0.0004
2080	1.9035	0.00028	31.3	0.08	0.997	0.0005	2.998	0.0023
2418	1.9035	0.00004	31.3	0.05	0.996	0.0030	2.997	0.0027
Overall	1.9035	0.00017	31.3	0.07	0.997	0.0018	2.997	0.0021
CPE								
2020	2.0453	0.00040	31.3	0.09	1.000	0.0011	3.002	0.0032
2080	2.0450	0.00019	31.3	0.04	1.001	0.0007	3.003	0.0007
2418	2.0454	0.00013	31.3	0.00	0.998	0.0011	3.003	0.0000
Overall	2.0452	0.00030	31.3	0.06	1.000	0.0017	3.003	0.0018
EPI-CO								
2020	4.5781	0.00007	63.6	0.00	0.996	0.0008	2.995	0.0017
2080	4.5774	0.00019	63.6	0.05	0.993	0.0008	2.996	0.0011
2418	4.5775	0.00008	63.7	0.00	0.992	0.0009	2.995	0.0019
Overall	4.5777	0.00034	63.6	0.05	0.994	0.0020	2.995	0.0016
EPDM								
2020	2.2415	0.00008	38.7	0.04	0.996	0.0011	3.000	0.0018
2080	2.2416	0.00021	38.8	0.09	0.995	0.0008	3.001	0.0015
2418	2.2424	0.00007	39.0	0.04	0.992	0.0008	3.002	0.0018
Overall	2.2418	0.00044	38.8	0.13	0.994	0.0019	3.001	0.0019

To determine how important the statistical differences were, the root mean squared error (RMSE) was calculated and compared to the precision target values for this study (Table 15). The thickness of HDPE and the weight of EPDM both were greater than the precision requirements in Table 15 (see Table 18). A precision of 1.0 mil for HDPE thickness was achieved while the target precision was 0.7 mil. The weight measurement of EPDM had a precision of 1.1 mg with the target precision of 0.9 mg. This is as one would expect considering observable properties of these materials.

TABLE 18. PRECISION OF TECHNICIANS

	Measurement			
Material	Weight (grams)	Thickness (mil)	Width (inch)	Length (inch)
HDPE	0.0004	1.0	0.002	0.001
PVC	0.0001	0.1	0.001	0.002
CPE	0.0004	<0.1	0.004	0.001
EPI-CO	0.0009	0.1	0.005	0.002
EPDM	0.0011	0.3	0.004	0.003
Target	0.0009	0.7	0.006	0.006

Because of the stiffness and curvature of HDPE, the thickness measurement is very technique-dependent. To measure thickness of HDPE using the dial micrometer, it is necessary to hold the sample flat on the anvil. The pressure applied to flatten the sample affects the measurement. Also, with HDPE, the sample has to be placed on the anvil with the cut side up to obtain consistent results. (This practice was routinely followed in this project.) With unimmersed material, the precision of 1.0 mil is as precise as can be achieved in a controlled evnironment using a dial micrometer.

Using calipers may give a more precise measure of HDPE thickness. When measuring thickness, two forces affect the technicians ability to measure accurately: indentation and curvature. Generally FMLs are soft enough that indentation is the primary problem in measuring thickness. The larger surfaced pressure foot of the dial micrometer is preferred over the smaller surfaced calipers. A larger surface reduces the effect of indentation while a smaller surface reduces the effect of curvature. In the case of HDPE, a stiff material which is prone to taking the curved shape of the roll, smaller surface instruments like calipers may be required to reduce the effect of the curvature. However, this could result in reduced precision because of indentation. Precision of 1.0 mil for this HDPE is reasonable.

The weight of EPDM is dependent on the amount of handling the specimens receive. EPDM is covered with a powder and handling gradually removed this powder. In a situation where three people handle the same specimens, the first person would be measuring a heavier, more powdered specimen, while the last technician would be measuring a lighter, less powdered specimen.

To test this hypothesis, a small rectangle of EPDM was weighed, and then washed, dried and weighed again. The specimen lost 6.4 mg which is plenty to account for the 1.1 mg range between the technicians values. To further support this conclusion, the technician with the lowest weight value was the last to measure the coupons. Also, there was no trend or indication that the technician with the highest mean and furthest from the overall mean, technician #2418, was typically inaccurate in weight and dimension measurements of other materials.

TENSILE PROPERTIES MEASUREMENT

Calibration of tensile and tear test equipment included periodic dead load tests to assure accuracy of the load cells and annual calibration of the test system by the equipment manufacturer. Calibration records are on file at NSF.

Three tests were conducted to measure accuracy and precision tensile properties measurements for unimmersed material: 1) measurement of split samples between NSF and the manufacturer, 2) split sample testing between NSF and the U.S. Bureau of Reclamation, and 3) inhouse precision study on all materials. Summary results are presented in Tables 19, 20, and 21.

Table 19 compares tensile properties test results as measured by NSF and the manufacturer who supplied the material. Manufacturers were asked to test the material before submitting it to NSF but to hold the results until NSF completed testing. NSF's results were then submitted to the manufacturer prior to NSF seeing the manufacturers results. The agreement is good.

The agreement is equally good between NSF and the USBR, as shown in Table 20. For all interlaboratory data, there is no evidence of systematic error at NSF. For a given test, NSF results are both higher and lower than other laboratories.

Table 21 presents typical precision data for tensile properties tests for unimmersed material. The data presented are percent coefficients of variation (standard deviation X 100 ÷ mean) for tests conducted on liners prior to immersion. Coefficients of variations are based on five replications. The precision meets the goals set in Table 15.

COMPLETENESS

Table 22 presents data for completeness by test and material. The completeness goal of 95 percent was met with the exception of some HDPE tensile tests. The best measure of completeness for this project is the percent of weight measurements completed. Some tensile tests could not be completed after an immersion because the material was degraded too much for physical properties tests. Weight measurements were 100 percent complete for all materials and represent the number of planned immersions carried to completion.

Yield strength, elongation at yield, and modulus of elasticity for HDPE are not reported as 95 percent complete because not all data for these measurements were included in this report. Early project data for these three measurements for HDPE immersions in water and inorganic chemicals were obtained through interpretation of analog data. A test system upgrade allowed for digital output and computer aided interpretation. Although both procedures were accurate, the digital data interpretations were more reproducible and were the only ones included in the final data evaluations.

TABLE 19. COMPARISON OF NSF AND MANUFACTURER TENSILE PROPERTIES TEST RESULTS

Test	Breaking[a] Factor (lbs/inch width)	S-100[a] Modulus (lbs/inch width)	Elongation[a] at Break (Percent)	Tear[a] Resistance (Pounds)
Material				
CPE				
NSF	54.2	37.6	437	7.54
Manufacturer	56.9	29.9	346	8.49
CSPE				
NSF	41.7	NT[b]	418	7.7
Manufacturer	48.4	NT	415	10.4
EPDM				
NSF	63.4	NT	402	8.9
Manufacturer	51.0[c]	NT	420[c]	6.8
EPI-CO				
NSF	96.4	NT	302	13.0
Manufacturer	121.0	NT	340	16.0
HDPE				
NSF	153.1	NT	647	26.2
Manufacturer	NT	NT	NT	NT
PVC				
NSF	88.3	50.8	450	10.6
Manufacturer	90.6	46.4	480	12.1

a. Only machine direction results reported

b. NT - Not tested

c. A one-inch-wide specimen was tested

TABLE 20. COMPARISON OF NSF AND USBR TENSILE PROPERTIES TEST RESULTS[a]

Material	Breaking Factor (lbs/inch width)	S-100 Modulus (lbs/inch width)	Elongation at Break (Percent)	Tear Resistance (Pounds)	Modulus of Elasticity (lbs/sq. inch)
CPE					
NSF	54.2	37.6	437	7.5	NT[b]
USBR	65.6	30.3	492	6.6	NT
EPDM					
NSF	63.4	4.1	402	8.9	NT
USBR	66.0	NT	443	8.2	NT
HDPE					
NSF	153.1	NT	647	26.2	64,090
USBR	148.8	NT	658	24.6	58,000
PVC					
NSF	88.3	50.8	450	10.7	NT
USBR	92.0	33.0	455	10.2	NT

a. Machine direction results only

b. NT - Not tested

TABLE 21. PERCENT COEFFICIENT OF VARIATION OF TENSILE PROPERTIES TESTS FOR UNIMMERSED MATERIALa

Material	Breaking Factor	Elongation at Break	S-100 Modulus	Tear Resistance	Yield Strength	Elongation at Yield	Modulus of Elasticity
CPE							
Machine	1.1	2.4	2.5	1.2	NT[b]	NT	NT
Transverse	0.7	2.8	2.0	1.3	NT	NT	NT
CSPE-LW							
Machine	3.8	6.6	6.5	1.6	NT	NT	NT
Transverse	3.7	3.0	4.3	1.0	NT	NT	NT
EPDM							
Machine	6.7	2.4	7.4	2.7	NT	NT	NT
Transverse	2.4	4.0	3.8	1.3	NT	NT	NT
EPI-CO							
Machine	3.4	13.1	4.4	1.8	NT	NT	NT
Transverse	1.6	4.7	1.5	5.3	NT	NT	NT
HDPE							
Machine	5.6	4.3	NT	NT	6.4	10.4	3.0
Transverse	6.3	7.1	NT	NT	5.6	4.9	4.0
PVC							
Machine	2.5	3.8	1.0	1.5	NT	NT	NT
Transverse	1.9	3.3	1.7	2.2	NT	NT	NT

a. Five specimens were tested at NSF for each material and direction

b. NT - Not tested

TABLE 22. PERCENT COMPLETENESS OF DATA

Material	CPE	CSPE	EPDM	EPI-CO	HDPE	PVC
Test						
Weight	100%	100%	100%	100%	100%	100%
Dimension	100%	100%	100%	100%	100%	100%
Breaking Factor	98%	99%	100%	98%	97%	98%
Elongation at Break	98%	100%	98%	98%	97%	98%
S-100 Modulus	98%	99%	N/A	N/A	N/A	98%
Tear Resistance	99%	99%	100%	99%	100%	100%
Yield Strength	N/A	N/A	N/A	N/A	94%	N/A
Elongation at Yield	N/A	N/A	N/A	N/A	94%	N/A
Modulus of Elasticity	N/A	N/A	N/A	N/A	93%	N/A

CONTROL OF IMMERSION CHEMICAL CONCENTRATION

The primary data used for evaluation of resistance of a liner material to a chemical was the response of that liner to immersion. When testing a waste or leachate, the chemical(s) causing the response may be unknown. The FML response is of primary importance. Consequently, knowing the absolute concentration of a chemical at all times was not critical to the data interpretation.

The loss of chemical concentration from solution could occur by three pathways; evaporation, absorption into the liner, and chemical transformation. It was assumed that loss due to chemical transformation would be negligible because the chemicals used were not labile, and the only other substances present which could react with the immersion chemical were water and the liner.

Evaporation was controlled by sealing the two-gallon immersion jars (two-month immersions) with temperature- and water-resistant rope caulking and moisture-resistant tape. Saturated solutions of MEK and oil were maintained by keeping an excess layer of the solvent on top of the water. Chemical solutions for two-year immersions were kept in quart jars with screw-on lids. The solutions in the two-year immersion jars were replaced every four months. Concentrations of chemicals were measured right after mixing to assure that make-up concentrations were correct. Chemical concentrations were also analyzed at various intervals to determine how well the solution concentrations were maintained.

Table 23 shows the range of percent of target concentrations for organic chemicals measured in jars immediately after immersion. The goal was to have all immersion concentrations be 100 ± 10 percent (wt:wt) of target. Furfural and phenol were generally within the target range. One furfural solution targeted for 8 percent in a 23°C immersion was measured to be 86.9 percent of target. One mid-range MEK solution was measured at 84.6 percent of the target of 4 percent. Target concentrations for DCE were harder to attain. DCE is not very soluble in water, is volatile, and was difficult to get into solution. However, the ratio of low to high DCE concentrations was attained.

Figures 8 and 9 show the concentrations after immersion periods of up to 56 days at 23 and 50°C for phenol and furfural respectively. The concentrations of these two chemicals were very stable over time.

Figure 10 shows the percent of target concentration for MEK at 23 and 50°C. MEK concentration was not as stable, particularly at 50°C.

The increase in chemical loss with increasing temperature implies that volatile loss was the primary reason for loss of solvent. Data for MEK in Figure 10 after 56 days were for two-year immersion samples in one-uart jars.

The results for DCE are shown in Figure 11. The results are similar to those for MEK; more apparent volatile loss at 50°C.

TABLE 23. LOW AND HIGH PERCENT TARGET CHEMICAL CONCENTRATIONS AFTER INITIAL MIXING[a]

Target Concentration (Percent wt/wt)	Percent of Initial 23°C	Target Concentration 50°C
Furfural		
1	98.0 - 106.0	95.0
4	97.5 - 104.5	101.0
8	86.9 - 101.3	106.8
Phenol		
1	90.0 - 110.0	100.0 - 110.0
4	97.5 - 107.5	92.5 - 112.5
8	91.3 - 101.3	96.3 - 101.3
MEK		
3	100.0 - 100.0	----
13	84.6 - 92.3	----
26	----[b]	----
DCE		
0.1	74.0	53.0 - 74.0
0.5	50.0	56.0 - 86.0
0.8	70.0	50.0 - 83.8

[a] If only one number is shown, only one measurement was made

[b] Saturated MEK solutions maintained by keeping a layer of MEK on top of the aqueous phase

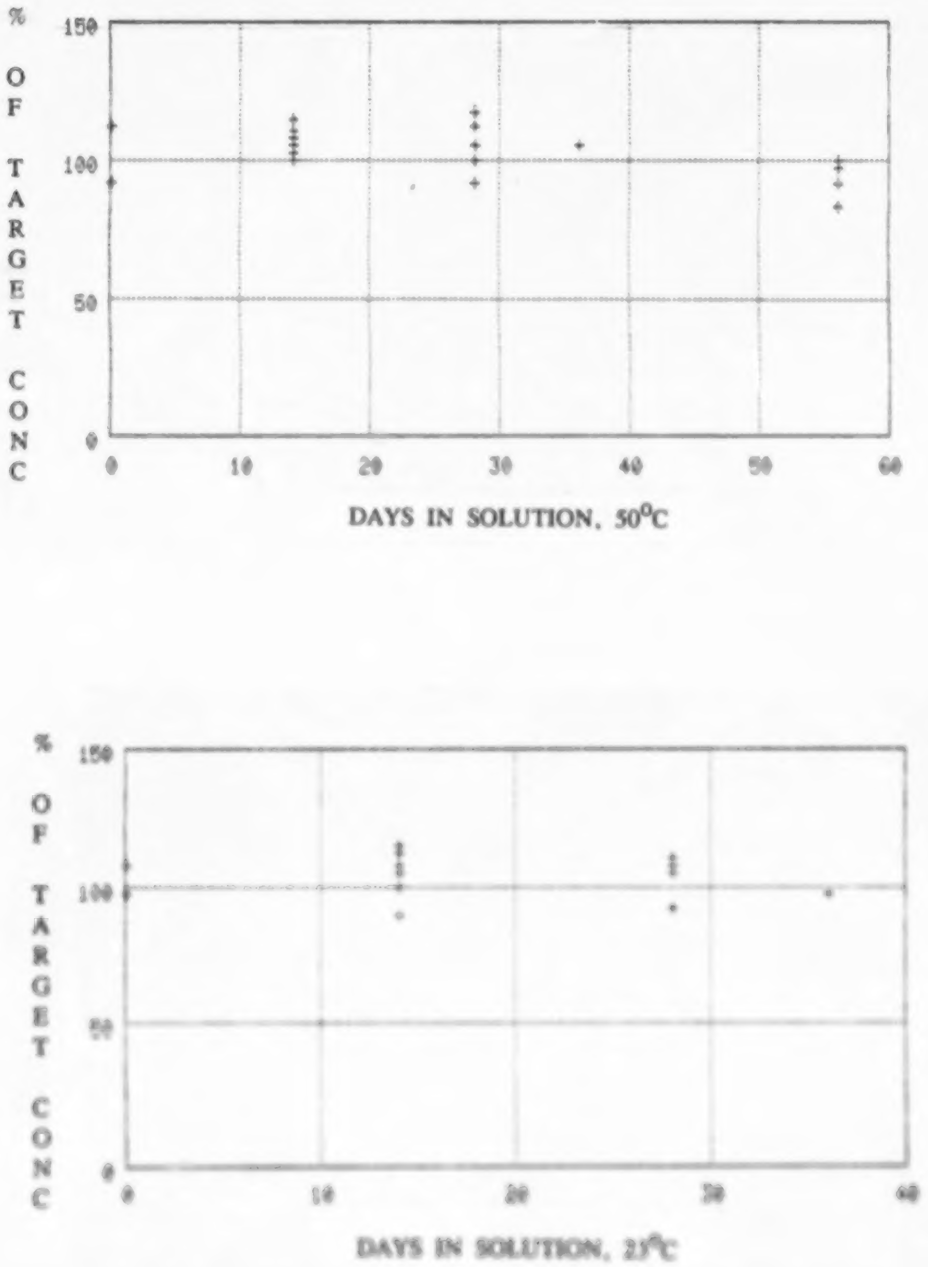


Figure 8. Percent of target concentration of 4 percent phenol solution versus days in solution

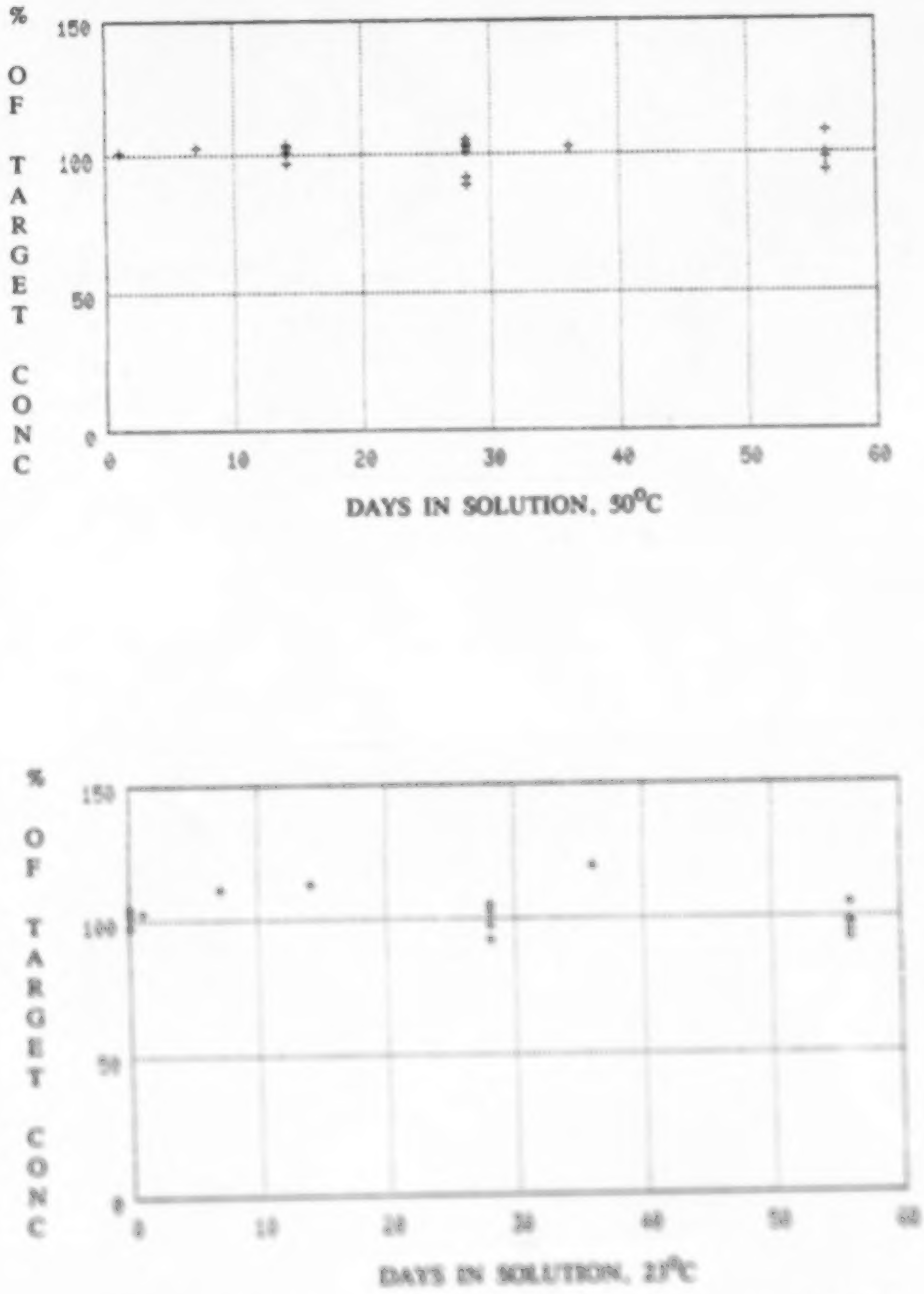


Figure 9. Percent of target concentration of 4 percent furfural solution versus days in solution

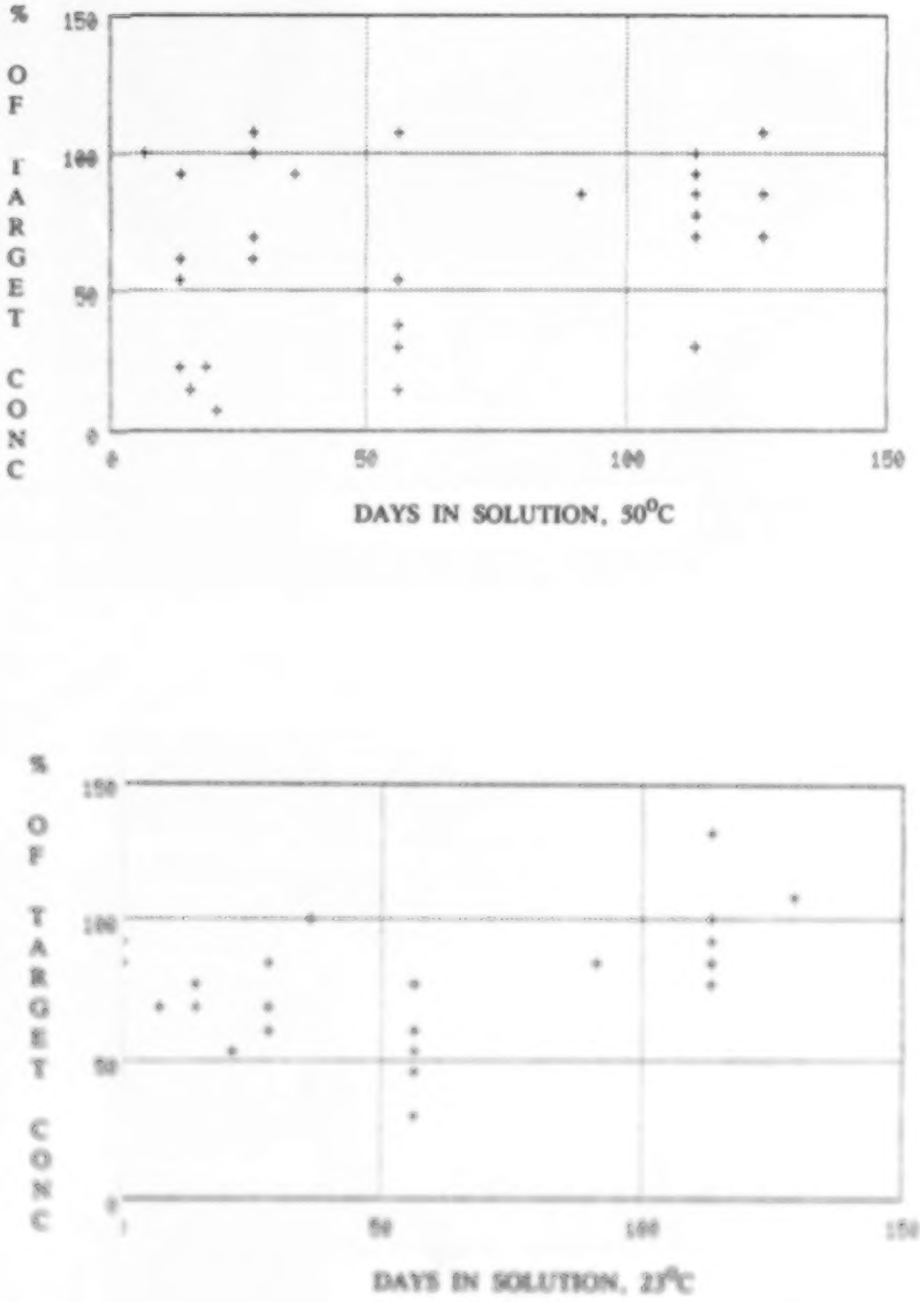
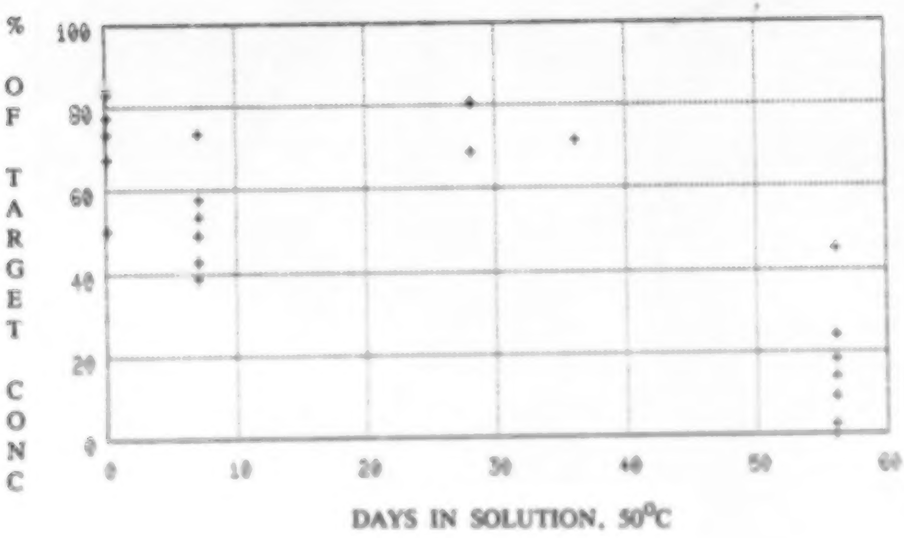


Figure 10. Percent of target concentration of 13 percent MEK solution versus days in solution



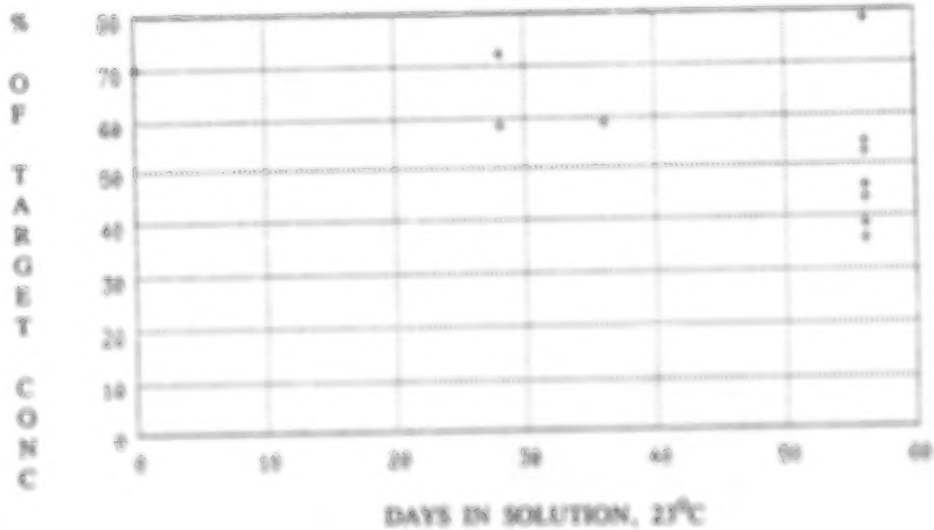


Figure 11. Percent of target concentration of saturated DCE versus days in solution

There were no instances of complete loss of solvent measured. Absence of solvent was not a factor in data interpretation. All liner response data exhibited the anticipated concentration dependence indicating that changes in chemical concentration did not influence the liner response approach to chemical resistance evaluation used in Section 8 of this report. This does not mean, however, that evaporative loss is not important to control when using immersion tests (e.g., EPA Method 9090) to evaluate liner resistance to a real waste. There is a relationship between chemical concentration and liner response, and the liners in this study were generally less resistant to the more volatile low molecular weight organics than other chemicals.

All chemical concentration data are presented in Appendix D.

DATA CONTROL

Data from bench sheets were manually entered into NSF's Digital Equipment VAX 11-70 computer system. After entry, edit sheets were printed and proofed against bench sheets. Data was also reviewed for completeness and reasonableness. (e.g., units, decimal places, significant figures, etc.) All data review was completed prior to data analysis.

REPLICATE TEST RESULTS

PVC and EPDM materials were tested in triplicate for immersions at 23° C. The purpose of the triplicate analysis was to measure the precision of the entire immersion test procedure.

A one-way ANOVA was performed on the triplicate data to determine if the triplicates gave statistically equal results for repeated tests. If the ANOVA showed a statistical difference at the 95 percent confidence interval, the RMSE was calculated to determine if any statistical differences were important. The RMSE was also used to give an indication of the precision achieved with immersed materials.

Several sets of triplicate data were determined to be statistically different. An examination of the RMSE indicated that the target precision for physical properties tests of polymeric materials of ± 10 percent is unrealistic. This is particularly true after immersion in chemicals. Tests precision was discussed previously in this section under subheading "Tensile Properties Measurement".

Measurement precision varied with resistance, material and the property being tested. Most non-resistant material/chemical combinations gave results that were highly variable. In fact, the precision of a measurement after immersion may be another useful tool for determing chemical resistance. However, this concept needs further study. Non-resistant data was not used when establishing the precision of each physical properties test for PVC and EPDM. In general, the measurements of EPDM were less precise than the PVC measurements, however, elongation at break was more precise for EPDM than PVC.

The most precise measurement was the breaking factor for PVC of ± 11 percent and the least precise measurement was the normalized breaking factor for EPDM of 38 percent. Most of the measurement resulting from resistant material/chemical combinations (94 percent) were precise within ± 20 percent. EPDM elongation at break and PVC tear varied ± 25 percent; EPDM normalized tear and PVC S-100 modulus varied about ± 30 percent; and PVC elongation at break varied about ± 36 percent.

It is difficult to control the many effects acting on a material immersed in a chemical solution (e.g., solution concentration). Table 21, showing the precision of physical properties tests of unimmersed materials, gives precisions better than the ± 10 percent target. This indicates that the large variability in the physical properties results of the immersed materials is caused by the many variables acting on a material when it is immersed in a chemical rather than caused by problems in a technique or in the equipment used. For an experiment of this design, the measurements were as precise as possible.

SECTION 7

SAFETY

DESCRIPTION OF HAZARDS

A summary of the potential hazards of each chemical used in the study is presented in Table 24. The categories of hazards are flammability, reactivity and health. The categories are rated on a 4 point scale: minimal, moderate, hazardous, and extreme. Also included in the table are recommended personnel protection measures. This information was compiled from Material Safety Data Sheets (MSDS). As a minimum, all protective measures were used in this project.

TABLE 24. POTENTIAL HAZARDS OF IMMERSION CHEMICALS

Chemical	Flammability	Reactivity	Health	Protective Measures
ASTM No. 2 Oil	Moderate	Minimal	Minimal	None Specified
Sodium Chloride	Minimal	Minimal	Minimal	None Specified
Water	Minimal	Minimal	Minimal	None Specified
Potassium Dichromate	Minimal	Minimal	Moderate	Gloves, safety glasses, laboratory coats, exhaust
Hydrochloric Acid	Minimal	Minimal	Extreme	Gloves, safety glasses, laboratory coat, general protection from burns
Sodium Hydroxide	Minimal	Moderate	Extreme	Gloves, safety glasses, laboratory coat, exhaust

TABLE 24. (Continued)

Chemical	Flammability	Reactivity	Health	Protective Measures
1,2-Dichloroethane	Extreme	Moderate	Hazardous	Gloves, safety glasses, laboratory coat, exhaust, vapor mask or respirator, grounded storage container
Furfural	Moderate	Minimal	Moderate	Gloves, safety glasses, laboratory coat, exhaust, grounded storage container, respirator available
Methyl Ethyl Ketone	Extreme	Minimal	Moderate	Gloves, safety glasses, laboratory coat, exhaust, grounded storage containtainers, store away from ignition sources
Phenol	Moderate	Minimal	Hazardous	Neoprene rubber gloves, goggles and face shield, laboratory coat, exhaust

ACTIONS TAKEN TO PREVENT HAZARDS

A review of safety procedures for chemical immersion testing was performed by the Michigan Occupational Safety and Health Administration (MIOSHA). Areas covered included chemical handling, protective clothing, vapor concentrations in air, respiratory protection, and general safety precautions. The review, offered as a free consultation service by MIOSHA, was performed at the request of NSF.

The following procedures recommended by MIOSHA were used to protect technicians and avoid accidents.

Chemical Handling

Drums of full strength organic chemicals were stored near a hood and grounded throughout their use.

Jars of dilute chemicals (exposure solutions) were transported in low carts and care was taken not to overload. The larger jars were stored on lower shelves. Jars with organic chemicals were taped with duct tape around the lid to prevent splashing when transporting.

The organic chemical waste drum was kept in the 23°C exposure chamber under the exhaust port. When emptying a jar into the drum, the auxiliary blower was turned on, the damper was fully opened and the vent in the drum was opened.

Protective Clothing

For mixing the solutions, filling and transporting the jars, and immersing and deimmersing the samples, the following protective clothing was used: lab coat, chemical resistant apron, thick chemical resistant gloves, sleeve protectors worn over the lab coat, goggles, closed shoes, protective skin cream for the face and neck area. Both organic vapor and acid gas respirators were available for use in operations where vapors were present.

Location of Safety Equipment

All personnel were shown the location and use of the showers, fire extinguishers, eye wash stations and spill control centers.

Transport Route

The transport route was between the solution prep room and the exposure chambers. Great care was taken to keep the path free of liquids and debris that would cause slippery spots.

Work Area

The work area was kept clean and neat to avoid accidents caused by scattered tools, improper disposal of paper towels, or jars not put away.

Sample Handling

Disposable polyethylene gloves were worn when handling samples that had been immersed in chemical solutions. A portable hood was used to store samples which had been immersed in organic solutions while they were waiting for testing. After the tests were completed, the samples were stored in plastic bags in a box in the 23°C chamber for two weeks, at which time they were discarded.

Chamber Entry and Exit

Specific instructions were given on the entry and exit of the chamber to help keep the ventilation adequate, the exposure temperatures in the acceptable range, and the time spent in the hot chamber at a minimum. Technicians were instructed to minimize the time in the chamber, keep the door open when inside a chamber, and place a flag in the hallway to indicate to fellow workers that they were in the chamber.

In the case of a spill, spill kits were available to absorb the solvents and technicians were advised of hazards and procedures to be used.

Waste Disposal

Acidic and basic wastes were neutralized before being disposed. Wastes were collected in 55 gallon drums and hauled away by a licensed waste disposal contractor.

The following companies and Michigan Department of Natural Resources license numbers are pertinent.

National Sanitation Foundation
License No. MI D 059695452

Transport

Drug and Laboratory Disposal, Inc.
License No. MI D 092947928

Disposal

A-1 Disposal Corporation
License MI D 059695452

SECTION 8

RESULTS AND DISCUSSION

OVERVIEW OF DATA PRESENTATIONS AND DISCUSSIONS

Data and discussions are organized by material. No effort was made to compare material responses because each type of material has unique properties and unique responses to immersion. Each material section discusses criteria for determining chemical resistance unique to that material, rate of liner response and stabilization, magnitude of material response, type of effects observed, and indicators of non-resistance.

The data are summarized and discussed in this section. All data can be found in Appendix E. Results are presented for percent retention of initial property, mean material property values after immersion, and standard deviations for all measurements.

Process for Determining Chemical Resistance Criteria

The general criteria for determining whether a liner was resistant were whether the liner response (e.g., change in physical property) stabilized, and whether at the point of stabilization the liner had maintained enough of its initial properties to still provide its intended function. The need for a stabilized response is intuitive. A material which is continuing to change with time cannot be expected to remain in service for long periods of time.

The magnitude of material response which is significant as an indicator of non-resistance is less straight forward to determine. Both percent and absolute change were evaluated.

The process for evaluating the data involved several ways of looking at material response, such as:

- Comparing results with other data on liner/chemical resistance obtained from published reports and manufacturers literature, (10, 14, 17, 22-29)

- Correlating results of different measurements e.g., breaking factor, weight, etc., and establishing criteria for all measurements,

- Evaluating percent change in material property in the context of test variability, and

- Determining minimum physical properties which should be maintained after immersion.

There are no previously established or accepted benchmarks of performance based on immersion tests. The NSF Standard 54 physical property values suggest a possible benchmark which correlates well with existing chemical resistance data (30). The EPA draft guidance document suggests that the NSF Standard 54 specifications be used as absolute minimums for physical properties in immersion tests (3). For liners tested in this study for which there were material properties tables in NSF Standard 54, results of liner strength tests (e.g., breaking factor, etc.) generally fell below Standard 54 values after immersion in chemicals for which the liner was reported to be non-resistant in manufacturer's literature or other sources.

Using Standard 54 material properties values for virgin material to evaluate the physical properties of immersed material is justified when one considers the increased variability in physical properties measurement after chemical immersion. For example, for the PVC material tested in the study, the coefficient of variation for breaking factor was 2.5 percent for virgin material, and as high as 11.5 percent for the FML which had stabilized in 4 percent furfural. To pass Standard 54, the mean breaking factor for five specimens must be at or above the minimum value in the physical properties table. Comparing the average value of test results to a Standard 54 specification as a pass/fail criterion implies that 96 percent of the liner coupons tested are within ± 2 s.d. of the sample mean. If the sample mean and Standard 54 value was 50 lb/in., 2 s.d. would equal 2.5 lb/in. for the unexposed FML and 11.5 lb/in. for the FML after immersion in 4 percent furfural. Assuming a normal distribution of test data, this means that, two percent of the unexposed liner could have a breaking factor less than 47.5 lb/in. and still be acceptable, but two percent of the liner exposed to four percent furfural could have a breaking factor less than 38.5 lb/in. Therefore when increasing material variability after immersion is taken into account, the Standard 54 value is not too strict for evaluating immersed samples.

A maximum allowable change in physical properties is also necessary for evaluating chemical resistance for three reasons. If an FML's initial properties are much higher than the Standard 54 values, substantial material degradation could occur before the Standard 54 limit would be passed. Also, Standard 54 values are minimums, and give no guidance in cases where a property such as breaking factor may increase as a result of chemical exposure. Finally, acceptable changes in weight and volume can not be determined from Standard 54.

To determine percent change limits for chemical resistance evaluation, three steps were followed. First the variability of the immersion test method was established from replicate results (see Section 6) and from inspection of all immersion results for a material. Next, the magnitude of the variability was compared with the magnitude of change associated with published data for resistant and non resistant liner/chemical combinations (27). Percent change limits were then set at a magnitude which represents real change, not just limits of reproducibility. The third step was to establish percent change limits for measurements for which there was no published comparative data. For example, if published data were available for the breaking factor of PVC but not percent elongation at break, the data for percent elongation at break would be compared with limits set for breaking factor and Standard 54 minimum values to establish limits for percent elongation at break.

Curve Fitting Response Stabilization as a Function of Time

Data are collected sequentially through time on a physical characteristic (measured response) of a material exposed to a chemical. The objective is to determine whether the material stays within appropriate control limits with respect to a physical characteristic by studying the pattern of change of the physical characteristic. In particular, one common objective is to determine whether the characteristic stabilizes or continues to change in a monotonic fashion (increasing or decreasing). If the characteristic stabilizes, then the limiting value and the rate at which the limiting value is approached are both of interest.

There are several possible conclusions that could be reached about the stabilization of a material property.

- The property doesn't stabilize and exceeds percent change limits within too short a time.
- The property doesn't stabilize but is not projected to exceed percent change limits for such a long period of time that the material is judged to be acceptable.
- The property stabilizes, but at too high a level too soon.
- The property stabilizes at too high a level but remains within control limits for an adequate period of time.
- The property stabilizes at a limit within percent change limits.

This proposed method is presented as a conceptual framework for addressing the problem of evaluating stabilization. Stability of response is described as an asymptotic approach to some fixed value. The fundamental tool proposed is the use of statistical inference for the parameters of a mathematical equation that describes the response of a material through time. The equation assumes that the measure will stabilize.

The equation can be used to project the expected value of the response in the future as well as the asymptotic level which is being approached. Projections based on the equation can thus be used as the basis of a decision process for evaluating the behavior of a material. The decision process should account for the uncertainly about the equation that results from the fact that it is estimated from data rather than being derived from a physical model.

The approach proposed here is based on the fitting of a model to early experimental data. The model used assumes that the measure will stabilize. Projections for subsequent behavior are then made based on the model. These projections are used for a variety of purposes, including determining whether or not to continue the experiment and deciding when to take the next sample if the experiment is to be continued. The level and rate at which stabilization is reached are predicted from the model.

There are several details that need to be resolved before this proposal can be considered to be a working methodology. Some of the issues that must be resolved before attempting to use this methodology on a routine basis are detailed next.

The objectives of a specific stabilization experiment should be listed in detail in order to determine an appropriate analytic methodology to address those objectives. Evaluating the response of a material to immersion is a complex process which may involve a series of decisions, each of which can have an effect on which data are collected for use in subsequent decisions. The possible steps in such a decision process should be documented before detailed analytical methods are developed to accompany each of the steps. Even after the objectives and corresponding methods are documented, it should be realized that exceptions to the rules may still occur and so the methods may have to be customized for specific situations.

The choice of a model i.e., the choice of the form of the equation, should be appropriate for the response and material being evaluated. Such choices should ideally be based on experience. Lacking experience, the methodology should include an explicit step for evaluating goodness of fit of the equation being used. Goodness of fit can be evaluated if there are replications at each time point during the experiment. Protocols should be developed for the number of replications at each time point.

Protocols must be developed which prescribe the minimum duration and number of samples for an experiment of a particular type. Such protocols must be specific to the material and characteristic being evaluated. This is especially important for characteristics that are likely to reach plateaus at several different epochs of an experimental evaluation. A naive analysis of data from the first epoch of such an experiment might indicate that stability had been achieved at the first plateau, which could result in serious decision errors. Prescriptions of the duration and replication for an experiment should be based largely upon experience so that appropriate analytical methods can be used.

Despite the need for development of individual protocols for each material and response, as discussed above, it is still possible to describe the broad characteristics of an analytical methodology for evaluating data from a stabilization experiment. Some of the characteristics of such an analytic methodology are discussed below.

One model for a response measure, Y, as a function of time, T, is given below where P1, P2, and P3, are to be estimated from the data. This equation is just one of the simplest of the many equations that could be used for evaluating stabilization.

$$Y = (P1 + P3\ T) / (1.0 + P2\ T)$$

At time 0, Y has the value P1. As T increases, this equation implies that Y approaches a limit of P3/P2.

In order to be judged successful, the material must behave as predicted by a model which assumes that the study characteristic will stabilize. The model is fitted based on accumulated data and the limiting level is computed from the estimated equation. Values are subsequently measured after continued exposure in order to see if the material is approaching the asymptotic limit predicted by the equation.

If the new results yield values within a range predicted by the model, then the material is judged to have stabilized. If the material appears not to have stabilized, then the experiment can be further extended assuming a higher stabilization level.

At any step in the procedure above, the experiment can be stopped and the material judged a failure if the results are not promising enough.

There are several computing programs that can be used to fit equations with asymptotic limiting values to data. For example, the BMDP programs are available on many mainframe computers and are available for the IBM XT personal computer (31). The nonlinear regression program in BMDP 3R, allows models to be fitted in which the mean response measure is contrained to approach a limit as time increases indefinitely. The 3R program with built-in function number 4 is convenient to use, although it is not the only such model nor is it necessarily the best.

The equation discussed above is one of the forms available in the BMDP series, a ratio of two polynomials of time. More than three parameters could be used, but would require more data. In order to assure that the model has a limiting asymptote, an odd number of parameters should be used. For the short series of observations typical of immersion tests, the best choice is probably three parameters.

The estimated response function can be used to calculate the limiting value, P3/P2 in this example. The approximate standard error of this estimate can also be calculated, using Fieller's Theorem for the ratio of two parameter estimates (32).

The next step is to calculate a time in the future when the behavior of the material will be tested again in order to see if it is behaving as predicted from the model. The time at which the response will reach 95 percent, for example, of the limiting value can be computed. If the predicted response at the last observed time is already over 95% of the limiting value, then calculate the time at which some higher value will be reached in order to test the predictive accuracy of the model.

Take k samples at this later test time. If the mean of k samples is within the appropriate prediction interval for the mean of k new observations, then the material is judged to have stabilized at the estimated limit. All of the data could then be used to re-estimate the limiting value, if desired.

The method described above is meant to give a framework for a decision process rather than to be a strict prescription for how to judge a material. The samples below show how the method could be applied to several data series from this study.

The model available in BMDP 3R was used with 3 parameters to analyze data from several data series recording weight change through time. The model for the weight change, Y, as a function of time, T, is reiterated below where P1, P2, and P3 are parameters to be estimated from the data.

$$Y = (P1 + P3\ T)/(1.0 + P2\ T)$$

As T increases, this model implies that Y approaches a limit of P3/P2.

The model can be inverted to give T as a function of Y:

$$T = (Y - P1)/(P3 - P2\ Y)$$

Figure 12 gives the results of analysis of the data for CPE in 4 percent Furfural at 50 degrees Centigrade. The predicted (P) and observed (O) values are plotted for the data through day 719. This set was chosen because the data plot indicates that the weight change has stabilized. The data at day 719 will be treated separately in order to demonstrate how the data through 622 could be used as part of a decision process for this material. The data at day 719 will be used as though it were collected after the analysis on day 622.

The data through day 622 were used to fit the three parameter function from BMDP. The resulting parameter estimates are P1=3.85, P2=0.027551, and P3=4.563867. The estimated limiting weight change percent is thus 4.563867/0.027551=165.7%, based on data through day 622. If this asymptotic limiting weight change predicted from data through day 622 were out of control limits for this type of material, then the experiment could be stopped at day 622. If the estimated limit is acceptable, then the experiment could be continued to see if the material appears to follow the projected behavior. If subsequent data indicates no problem with goodness of fit of the model and if the projected limit is acceptable, then the material will be judged to have satisfied the stability criteria for this property.

Steps for deciding how to continue the experiment will be discussed next. The observation at day 622 (the last day of the experiment so far) has a predicted weight change of 156.7% which is 94.6% of the estimated limit. Since this is already close to the projected limit, we have no prescription for choosing the next sample day. Consider a plan to take the next sample at day 719 (the day that was actually sampled). The projected weight gain on that day is 157.7%.

If the observation at day 719 is less than the upper 95% (95% is chosen arbitrarily and has nothing to do with the fact that the current weight gain is close to 95% of the limit) prediction interval for the projection, then the material will be assumed to be conforming to the projections of the equation.

In fact, the observation at day 719 turned out to be 156.1%, which is less than 157.7%, the predicted value at day 719, so the material is certainly below the upper prediction limit for day 719. Thus, there is no evidence that the weight change is approaching a limit higher than the estimated limit. If the

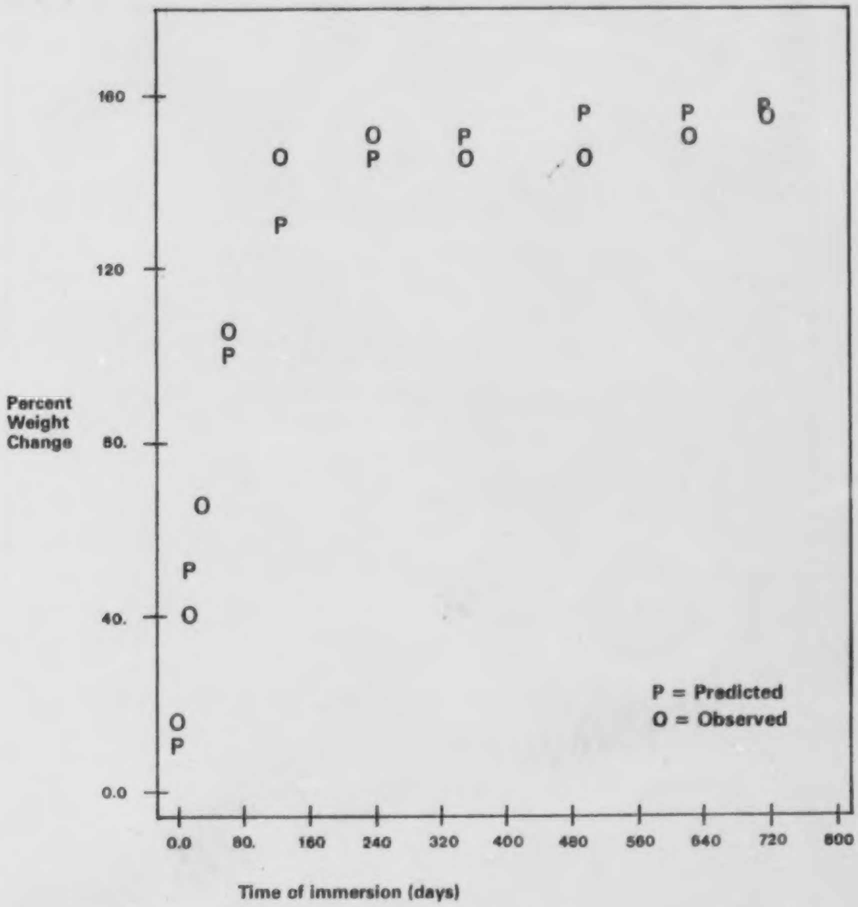


Figure 12. CPE in four percent furfural at 50°C, predicted versus observed values

weight gain had been larger than the upper prediction limit for the projection then the conclusion would be that the weight gain either has a higher limit or is increasing without limit.

When needed, the upper limit of the 95% prediction interval for a single new observation can be computed from:

Fitted value+1.96*root(mean squared error+variance(fitted value)), where the fitted value, mean squared error, and the variance of the fitted value can be derived from computer output.

Further analysis uses all of the data through day 719. The estimated limit based on all of the data is 165.2%=44.5888/0.027783. Feiller's theorem can be used to compute the s.e. of this estimate. The 95 percent confidence interval for this limit is between 157 percent and 180 percent (this is based on Feiller's theorem and can be computed with a programmable calculator).

Another example gives the results of analysis of data for EPDM in 8 percent furfural at 50 degrees Centigrade (Figure 13). This example was selected because the data do not appear to have stabilized. The analysis indicates that the limiting weight change will be 216%=0.2238/0.001036. The 95 percent confidence interval for this limit is very wide being between 158 percent and 620 percent. Suppose that we are interested in knowing when 95 percent of the projected weight gain will have occurred i.e., when 205.2%=0.95*216% will have occurred. The equation for T in terms of Y can be used to compute that the weight gain is projected to be 205.2% on day 18,445=(205.2-(-1.617802))/(0.2238-(0.001036*205.2)). The weight gain observed so far is just 42%=90.9/216 of the projected limit.

Note that the model for EPDM is being used to project, or extrapolate, the information through day 721 and a weight gain of 91% to day 18,445 and a weight gain of 216%. The numerical results of this large of an extrapolation are not very reliable, as reflected by the large confidence interval for the limit. Such extrapolation should only be used as a guideline to decide when

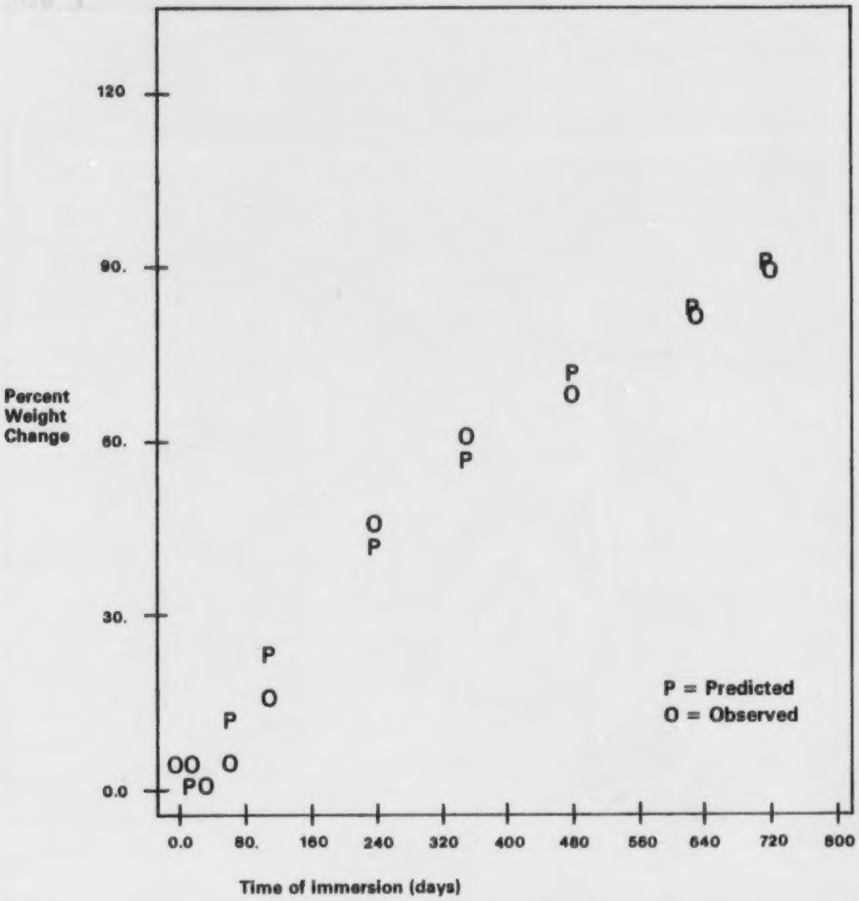


Figure 13. EPDM in eight percent furfural at 50°C

to take the next sample or in deciding whether or not to continue the experiment.

Temperature and Concentration Effects

Five basic types of response to chemical immersion were observed; minor change, swelling, swelling and softening with loss of strength, shrinking and stiffening with loss of elongation, and a combination of swelling and shrinking depending on immersion conditions.

The response of liners to increased immersion temperature shows that higher temperatures (at least up to 50°C) can be used to accelerate the material response for some materials but not others. Caution must be used to separate a temperature from a chemical response.

When the response was minor or the response time very fast, the difference in results between the two temperatures was often small. In these cases, a higher exposure temperature did not significantly accelerate the response, but neither did it change the response. This would indicate that the higher temperature itself did not affect the material nor did it speed up the test. Some data showed that the magnitude of the response did not increase with temperature, but the rate at which the response stabilized did increase. For such materials, temperature would be an effective method for accelerating immersion testing.

For other material/chemical combinations, the magnitude of response was affected by temperature. Using elevated temperatures for predicting chemical resistance is generally not a good practice unless a liner's response to heat stress is known.

Four organic chemicals were tested at three concentrations for all materials. All liner responses seen with these chemicals were affected by concentration. An example is shown in Figure 14, the effect of furfural concentration on PVC weight change, breaking strength, and S-100 modulus.

Although liner response as a function of concentration was not used to develop chemical resistance criteria in this report, this example shows the potential usefulness of concentration dependent data for selecting the best material for a specific waste or chemical application.

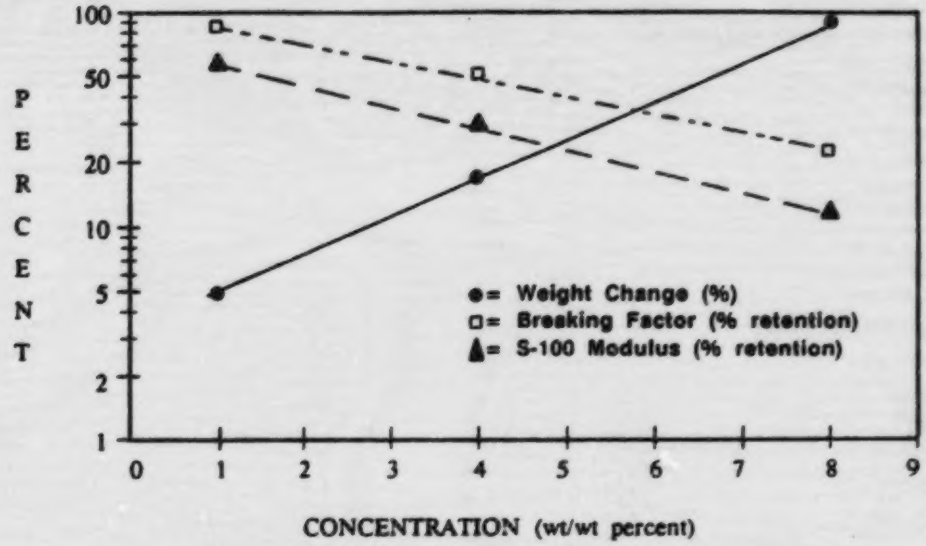


Figure 14. Relationship of change in physical property to furfural concentration at 23°C for PVC

The response to furfural (swelling and softening) increases with concentrations. The response (absorption of furfural) appears to be first order with respect to concentration, and could be represented as:

$$y = ae^{bx}$$

where y = liner response (percent retention of modulus, for example)

x = furfural concentration (wt/wt percent)

b = liner sensitivity factor

Plotting the y value on a log scale, the intercept of the line would be log(a), and the slope b. This type of graph could be useful in predicting acceptable chemical concentrations in a waste stream, based on allowable stabilized property changes. Note that it would be of use only if the FML material stabilizes in the waste solution, and if the response is first order, and if the chemical concentration is not expected to increase over the life of the application.

The liner sensitivity factor (b) could also be used to compare materials. The greater the value of b, the more susceptible the liner would be to changes in concentration or concentration gradients within a lagoon or impoundment.

Response as a Function of Liner Grain (Direction)

Generally, mechanical property results presented are for the machine direction. The machine direction is used in all graphs to allow presentation of the two-year tensile property results (for which there are only machine direction samples.) In the case of CPE, both directions are included.

EPDM - - with ethylene propylene diene rubber (EPDM), there was negligible difference between the transverse and machine direction results for mechanical properties after chemical immersion. The differences found in directional response for other materials were as follows:

EPI-CO - - strength and tear properties are slightly higher in the transverse direction, while elongation was slightly more in the machine direction. The difference between directions in response to chemical challenge was generally less than 15 percent, with the percent retention of properties slightly better in the transverse direction.

CSPE-LW - - breaking strength and S-100 modulus were less in the transverse direction than in the machine direction. The difference in response to chemical challenge, however, was generally less than 10 percent.

CPE - - in determining chemical resistance for CPE, both directions were considered because the mechanical properties were significantly different in the two directions. Breaking strength and S-100 modulus are less in the transverse direction than in the machine direction. The difference in response to chemical challenge in the two directions was generally less than 15 percent.

HDPE - - the transverse direction was slightly stronger than the machine direction. The only significant difference in response to chemical challenge in the two directions was for elongation at break, for which retention was less in the transverse direction. Percent change in mechanical properties was evaluated in both directions in determining chemical resistance.

PVC - - in general, strength is higher in the machine direction than in the transverse direction, but the response to chemical challenge, is similar.

Units of Measurement

For four of the six materials (PVC, CPE, EPI-CO, CSPE-LW), breaking factor and S-100 modulus were calculated in pounds per inch width (lb/in) and tear resistance was calculated in pounds. HDPE and EPDM had thicknesses that varied substantially throughout the material (more than three standard deviations from the average). In these cases, the strength properties (breaking factor and tear resistance) were normalized for initial thickness (as received). Breaking factor was converted to tensile strength in pounds per square inch (psi) and tear resistance was calculated in pounds per inch thickness (lb/in).

Weight was used as the indicator for swelling responses. Volume changes were generally larger than weight changes, but the two are closely related, and because the weight measurement is more precise, weight change was chosen for presentation. Weight changes are expressed as percent change (compared to initial weight).

Figures

The figures in this section show data points for the physical properties which represent the average of 5 test specimens. Each point on a weight or dimension figure represents 3 test specimens.

For EPDM and PVC, triplicates were performed for some conditions, resulting in multiple data points appearing for the same time in these figures.

Each curve was fit to a straight line, an exponential curve, a logarithmic curve, a power curve and a quadratic curve. The curve with the largest correlation coefficient (R^2) was chosen as appropriate and drawn in most cases. There were two scenarios when this procedure was abandoned: 1) all of the R^2's were so small that no curve could reasonably be chosen from the five choices and 2) the R^2's were large, however the curve indicated that the material reacted in a way that was not intuitively predictable from the data points. In almost all cases of the first situation the data appeared to form a horizontal straight line which cannot be modeled from the curves tested. A horizontal straight line was drawn for these cases. In the second case, the R^2 would indicate that a quadratic curve best fit the data. The curve would appear to fit the data well, however, between the last short immersion physical properties measurement (56 days) and the only physical properties measurement of the two-year study (at 2 years) the curve would dip down and then come back up to meet the last data point at two years. Without data between 56 days and two years, it is difficult to believe that the material would actually react in this way. In these situations the curve was smoothed out not showing the dip in the modeled curve.

Polyvinyl Chloride (PVC)

Criteria for Determining FML Chemical Resistance

Parameters for evaluating PVC chemical resistance include: stability of the liner's properties in contact with the waste, the magnitude of physical changes observed, and the type of change. Based on the data from this study, the following criteria are proposed for determining PVC chemical resistance with immersion tests:

- Stability of weight change and mechanical properties with time.
- A stabilized weight change of not more than five percent gain or ten percent loss.
- The breaking factor must be at least 80 percent of the initial value and equal to or greater than the minimum as-received value in the material properties table of NSF Standard 54 for the appropriate thickness.
- The percent elongation at break must be at least 70 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.
- The S-100 modulus must be between 60 and 140 percent of the initial value (based on the relationship of modulus to breaking factor and elongation).

These criteria are used in evaluating the FML's response to the chemicals in Table 25. Resistance or non-resistance is listed in the second to last columns, and the reasons for a non-resistance rating are given in the last column.

Response Time and Stability

Response time, or the time required for the liner to stabilize in a given solution, varied from less than one week to no stabilization after two years. Response time was generally faster for weight gain (absorption of chemical or water) than for weight loss (extraction of plasticizer).

Magnitude of Liner Response

To determine reasonable percent change limits for chemical resistance evaluation, three steps were followed. First, the variability of the property was evaluated. For example, Figure 15 shows the overall relationship of breaking strength and weight change (the figure shows weight changes between -30 and +30 percent weight change) for this FML. The variability of breaking strength measurements for this FML was roughly ± 15 percent, as measured by the center locus of points which correspond to a sample which showed resistant behavior. Next, the limits of variability defined in step one, and the overall range of observed property change were compared to reported chemical resistance information (10,14,17,22-29). Limits of acceptable change were then set. Third, limits for parameters such as percent weight change were set by determining the amount of change that correlated with the limits set for those properties listed in the Standard 54 material properties tables.

Types of Effects

The results in Table 25 for this plasticized thermoplastic PVC are grouped according to the type of effects seen. A temperature or concentration effect is noted in the third and fourth columns. Five basic types of response to chemical immersion were observed with this liner: minor change, swelling,

Table 25. POLYVINYL CHLORIDE (PVC): RESPONSE SUMMARY FOR CHEMICAL RESISTANCE

CHEMICAL NAME	CHEMICAL TYPE	TEMPERATURE EFFECT	CONCENTRATION EFFECT	TYPE OF RESPONSE	CONDITIONS		STABILITY ACHIEVED~	RESISTANT~	REASONS FOR NON-RESISTANCE *
Water	-	no	-	Minor Change	23 C	-	Y	Y	
					50 C		Y	Y	
Sodium Chloride	SALT	no	no	Minor Change	23 C	10% &	Y	Y	
					50 C	sat'd	Y	Y	
Potassium Dichromate	OXIDIZER	no	-	Minor Change	23 C	10%	Y	Y	
					50 C		Y	Y	
Hydrochloric Acid	ACID	yes	-	Swelling at 50 C	23 C	10%	N	N	S
					50 C		N	N	S, WG
Furfural	ALDEHYDE	no	yes	Swelling and Softening	23 C	1%	Y	Y	
						4%	Y	N	WG, BL, SL
						8%	Y	N	WG, BL, SL
					50 C	1%	Y	N	WG (marginal)
						4%	Y	N	WG, BL, SL
						8%	Y	N	WG, BL, SL
1,2-Dichloroethane	CHLORINATED HYDROCARBON	no	yes	Swelling and Softening	23 C	.1%	Y(v)	Y	
						.5%	Y(v)	N	WG, BL, SL
						.8%	Y(v)	N	WG, BL, SL
					50 C	.1%	Y(v)	Y	
						.5%	Y(v)	N	WG, BL, SL
						.8%	Y(v)	N	WG, BL, SL
Sodium Hydroxide	BASE	yes	-	Shrinking and Stiffening	23 C	10%	Y	N	WL, SG, EL
					50 C		N	N	WL, SG, EL
ASTM #2 Oil	OIL	yes	-	Shrinking and Stiffening	23 C	100%	Y	N	WL, SG
					50 C		Y	N	WL, SG, EL
Methyl Ethyl Ketone	KETONE	no	yes	Swelling and Softening with some later Shrinking and Stiffening	23 C	3%	Y(v)	N	BL, SL
						13%	Y	N	WG, BL, SL
						26%	Y(v)	N	WG, BL, SL, EL
					50 C	3%	Y(v)	N	WG, BL, SL
						13%	Y	N	WG, BL, SL
						26%	Y(v)	N	WG, BL, SL
Phenol	PHENOL	no	yes	Swelling and Softening at low concentration and shrinking and stiffening at high concentration	23 C	1%	Y	Y	WG(marginal)
						4%	Y	N	S
						8%	N	N	S, WL, SG, EL
					50 C	1%	Y	N	WG
						4%	N	N	S
						8%	N	N	S, WL, SG, EL

* S = No Stability, WG = weight gain, WL = weight loss, BL = Breaking Factor Loss, EL = Elongation at Break Loss,
SG = S-100 Gain, SL = S-100 Loss

~ Y = Yes, N = No, (v) = variable results due to volatility of chemical

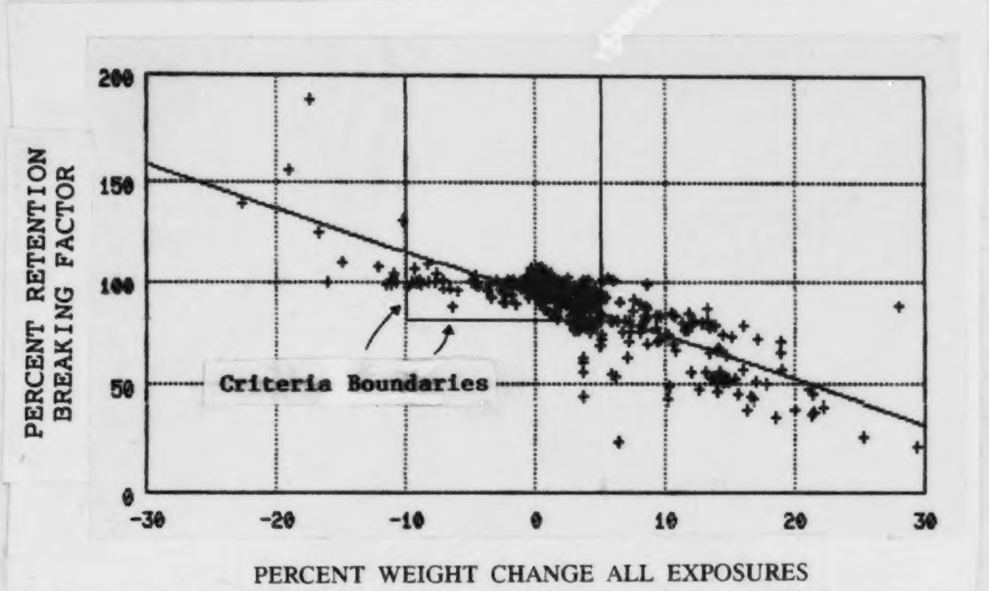


Figure 15. Relationship of breaking factor and weight change for PVC

swelling and softening with loss of strength, shrinking and stiffening with loss of elongation, and a combination of swelling and shrinking depending on immersion conditions.

Temperature Effects--

The response of this liner to increased immersion temperature shows that higher temperatures (at least up to 50°C) can be used to accelerate the material response.

When the response was minor or the response time very fast (inorganic salts, solvents methyl ethyl ketone and 1,2-dichloroethane), the difference in results between the two temperatures was small. In these cases, a higher exposure temperature did not significantly accelerate the response, but neither did it change the direction of the response. This would indicate that the higher temperature itself did not affect the material.

Temperature affected this FML's response to two conditions: immersion in both hydrochloric acid and in those chemicals which caused a weight loss. The liner response to hydrochloric acid at 50°C shows a much larger weight gain compared to the sample exposed at 23°C. But, at both temperatures, the weight gain was slow and steady, and had not stabilized after two years.

Both the rate and the magnitude of weight loss are affected by immersion temperature for the stiffening response. The initial rate of sample weight loss in NaOH was faster at 50°C, and the final weight loss was greater. The rate of loss, though, became similar at both temperatures after about 300 days of immersion.

Figure 16 illustrates the effect of temperature on weight change. This figure shows weight change as a function of time for both hydrochloric acid and sodium hydroxide immersion samples, at both 23 and 50°C. While the acid solution caused a weight gain and the caustic solution caused a weight loss, increasing the temperature did not change the nature of the response in either case. Both responses were accelerated, however. This indicates that an elevated temperature (at least up to 50°C) can be useful in accelerating chemical resistance testing for PVC, using these and perhaps other chemicals.

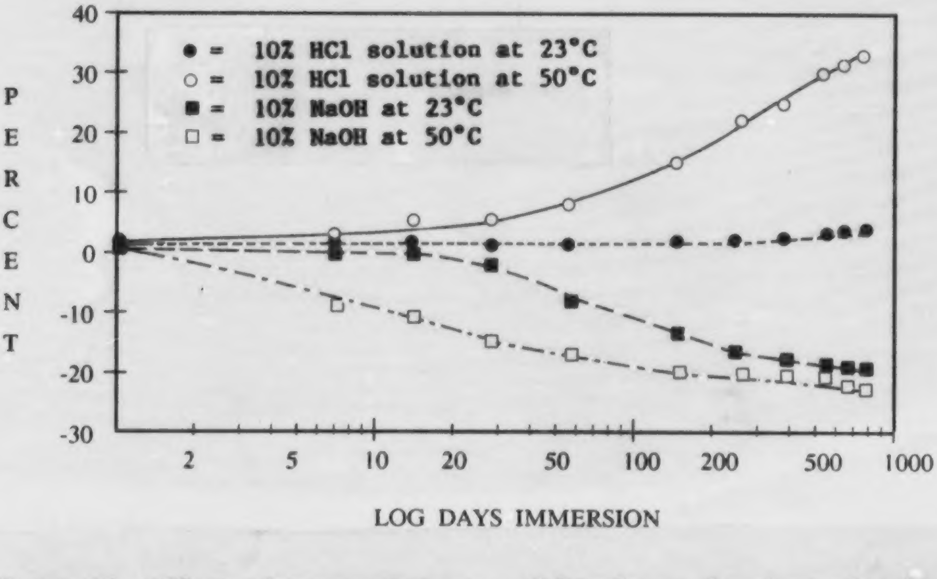


Figure 16. Effect of temperature on weight change for immersion in hydrochloric acid and sodium hydroxide at 23°C and 50°C

Concentration Effects--

Four organic chemicals were tested in three concentrations. All responses seen with these chemicals were affected by concentration. All four saturated organic solutions caused significant change in the liner properties, in some cases almost total loss of strength. But the response at lower concentration is much less severe, and appears to stabilize over time. Table 25 shows that the lowest concentrations tested of furfural (23°C only), 1,2-dichloroethane, and phenol (23°C only) are considered resistant using the above criteria.

Figure 14 shows the effect of furfural concentration on weight change, breaking strength, and S-100 modulus. The response to furfural (swelling and softening) stabilized with time at all concentrations. Stabilized properties (log scale) are shown as a function of concentration for the 23°C exposure samples. The response (absorption of furfural) appears to be first order with respect to concentration.

Indicators of Non-Resistance

For PVC, the most important indicators of non-resistance are weight change, breaking strength, S-100 modulus, and elongation at break. Tear resistance generally followed the same trend as breaking strength.

Changes in weight corresponded to changes in tensile strength and stiffness (S-100 modulus) for this liner. (The exception seen for PVC was for immersion in hot hydrochloric acid, which caused weight gain but no loss of strength.) In general, strength and modulus decreased with weight gain, and increased with weight loss.

When absorption of liquid (weight gain) is the response to chemical challenge, weight change, breaking strength, and modulus are key indicators of chemical resistance. Figure 15 shows the overall relationship of breaking strength and weight change (for weight changes between -30 and +30 percent) for PVC. Weight changes of about 5 percent correspond to a 15 percent loss of breaking strength, and a strength less than the minimum acceptable as-received value for this FML according to NSF Standard 54.

Weight loss indicates loss of plasticizer from the liner material. An FML formulation of this material can contain up to 35 percent plasticizer. For extraction of plasticizer, changes in weight and in modulus are particularly important. The beginning of plasticizer extraction (which can continue until the material becomes brittle) can be detected earlier by these measurements than by breaking strength or elongation. As shown in Figure 17, the rate of change in modulus with respect to weight change is greater than for breaking factor.

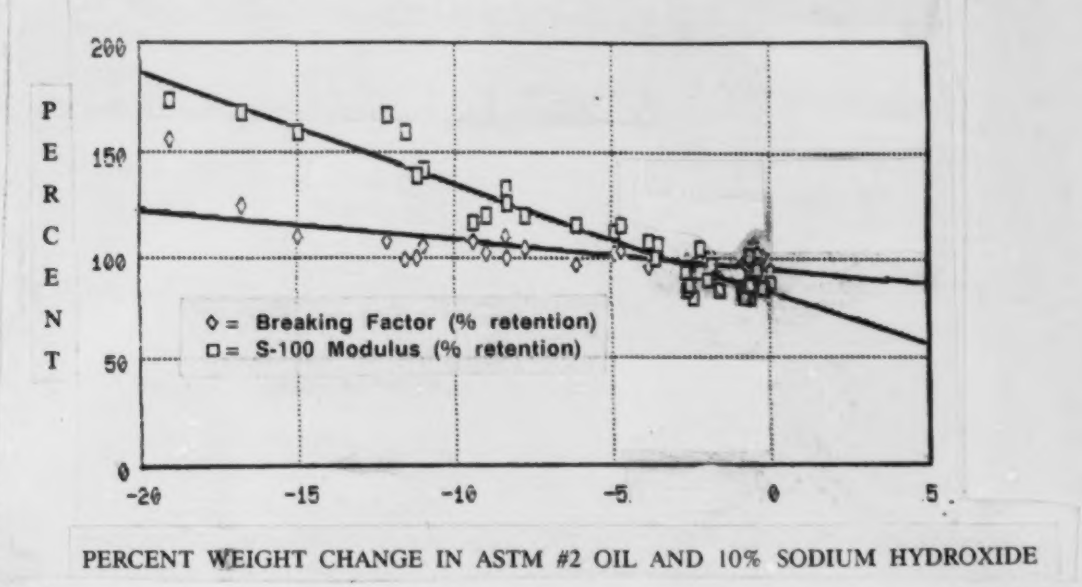


Figure 17. Relationship of breaking factor, S-100 modulus and weight change for PVC

Elongation at break appears to be the least sensitive, but the most decisive, measurement. The criteria established for elongation at break for PVC is ≥ 70 percent of initial and ≥ NSF Standard 54. The variability in measurement for resistant materials is large, roughly ± 20 percent. Until the sample is very stiff, and nearly brittle, elongation does not always correlate with other indicators. Figure 18 shows retention of ultimate elongation as a

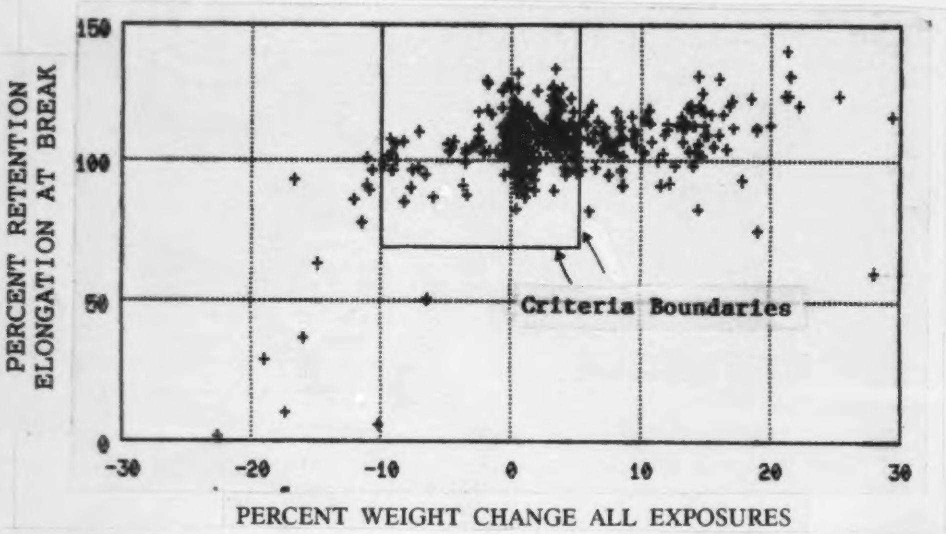


Figure 18. Relationship of elongation at break and weight change for PVC

function of weight change. Elongation is not a good indicator of material change for small weight losses or for weight gains for PVC. Only when the weight loss is around ten percent or more does the elongation show substantial decreases.

Minor change—

In water, salt, and potassium dichromate solutions only minor changes in weight and mechanical properties were observed. An example is shown in Figure 19. This figure shows the response of PVC to a saturated salt solution at 23° Centigrade. Very little change is seen in weight or mechanical properties, even after two years.

Swelling—

Hydrochloric acid immersion was the only exposure condition for PVC in which an increase in weight does not correspond to a decrease in strength. The liner had a long, slow weight and volume gain at 50°C that was an order of magnitude greater than the gain at 23°C (34 percent compared to 4 percent) after two years). There was no corresponding change in mechanical properties, however. Figure 20 shows the response of the liner to hydrochloric acid at 50°C.

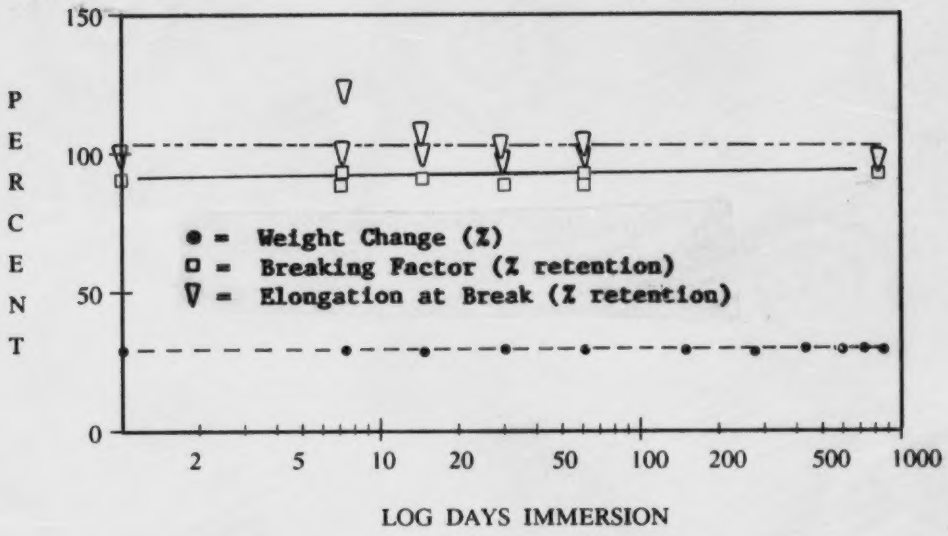


Figure 19. Physical property change with immersion in saturated salt solution at 23°C for PVC

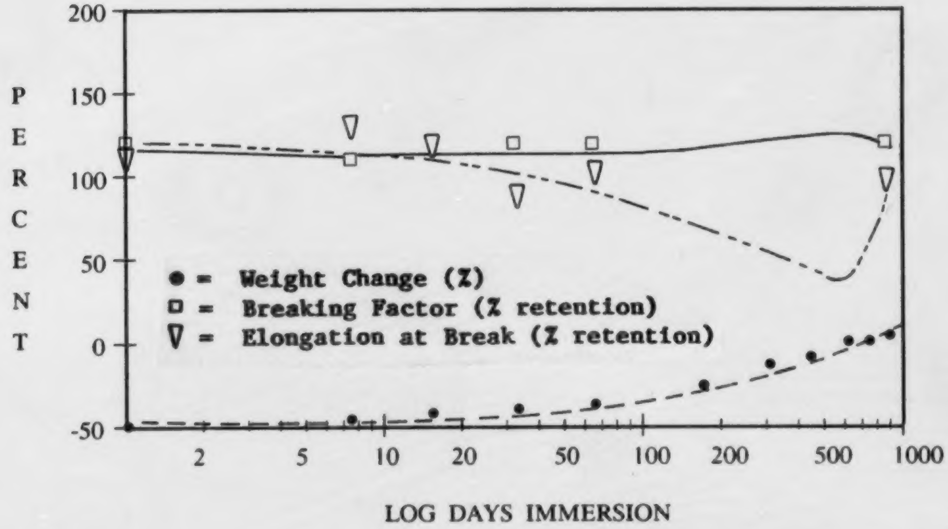


Figure 20. Physical property change with immersion in 10 percent hydrochloric acid solution at 50°C for PVC

Swelling and softening--

In furfural and 1,2-dichloroethane, this plasticized thermoplastic PVC liner swelled, softened, and decreased in strength, indicating absorption of liquid. Figure 21 shows an example of the liner response to 8 percent furfural.

In furfural, the liner's weight gain was slower and continued over a much longer time period than with 1,2-dichloroethane, but in both exposures the breaking strength response was fast and stablized. With the steady increase in weight it is surmized from the data that elongation at break continuously decreased after 56 days of immersion in furfural. This decrease would not be predicted by looking only at the short-term data.

Shrinking and stiffening--

Shrinking and stiffening, with gain in modulus, breaking strength, and loss of elongation, indicate loss of plasticizer. This response occurred with exposure of the PVC to ASTM #2 oil and 10 percent sodium hydroxide. In both chemicals, the liner became very stiff as immersion time increased, and sometimes was brittle, breaking as soon as a test load was applied.

Figure 22 presents the liner response to a 10 percent solution of sodium hydroxide at 23°C. The response was similar but more severe at 50°C. At 50°C, the liner sample became brittle after a two-year exposure and broke as soon as a load was applied. The S-100 modulus, although not shown on these figures, also increased with exposure to oil and sodium hydroxide.

Combination Response--

The fifth type of response seen in PVC was a combination of swelling and shrinking responses. This corresponds to rapid absorption of the immersion chemical and then a slower diffusion of additives (e.g., plasticizers) from the liner. Immersion in methyl ethyl ketone and phenol resulted in both swelling/softening and shrinking/stiffening depending on time, temperature, and concentration.

Exposure to these chemicals caused both absorption of the chemical or water into the liner and extraction of the plasticizer out of the liner. In

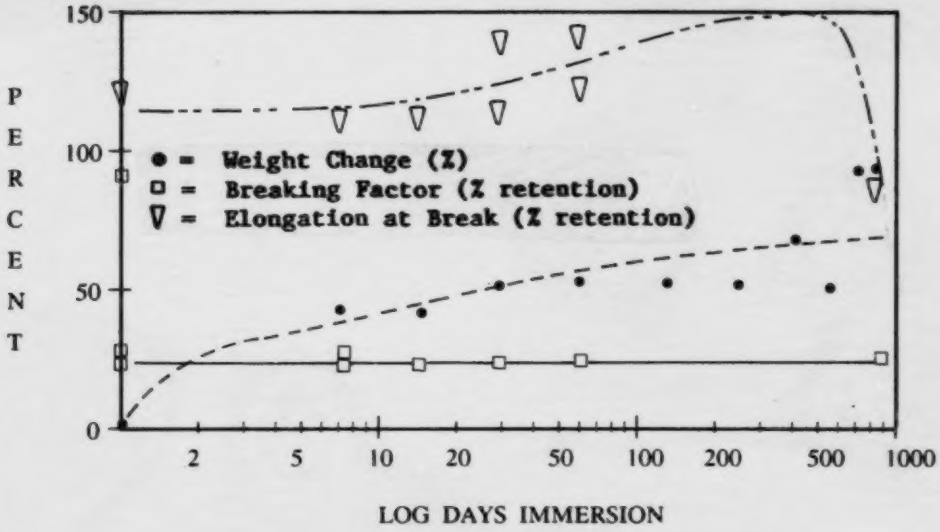


Figure 21. Physical property change with immersion in 8 percent furfural solution at 23°C for PVC

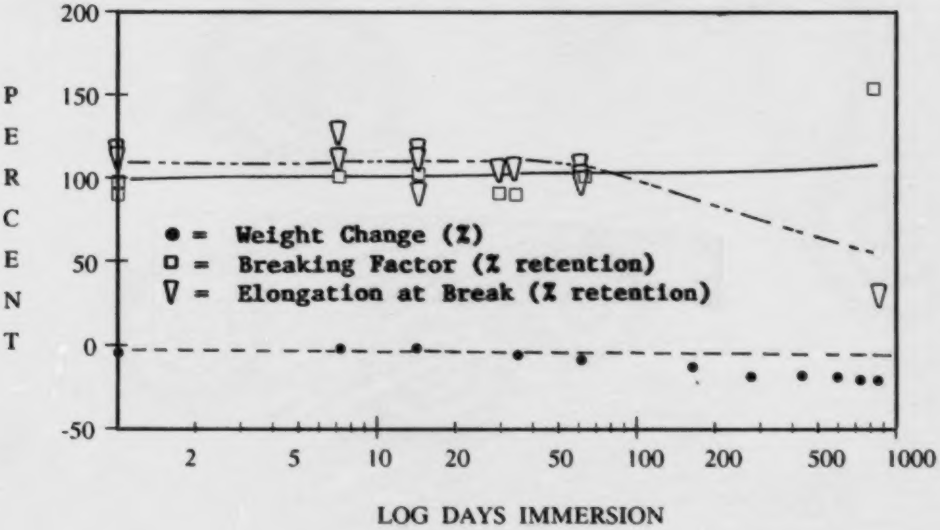


Figure 22. Physical property change with immersion in 10 percent salt solution at 23°C for PVC

general, the absorption process is faster, resulting in an initial weight gain that is dependent on concentration. As exposure time and/or chemical concentration increases, the slower extraction process becomes significant.

Figure 23 shows percent weight gain as a function of immersion time for samples exposed at 23°C. Weight gain is shown for samples exposed to 1, 4, and 8 percent phenol solutions. After a one day exposure, all samples have gained weight, and the weight gain increased with increasing phenol strength. This initial relationship of weight to concentration becomes reversed as the immersion time is lengthened. The lowest phenol concentration (1 percent) has the largest weight gain, and the highest concentration (8 percent) has the most weight loss, after two months immersion.

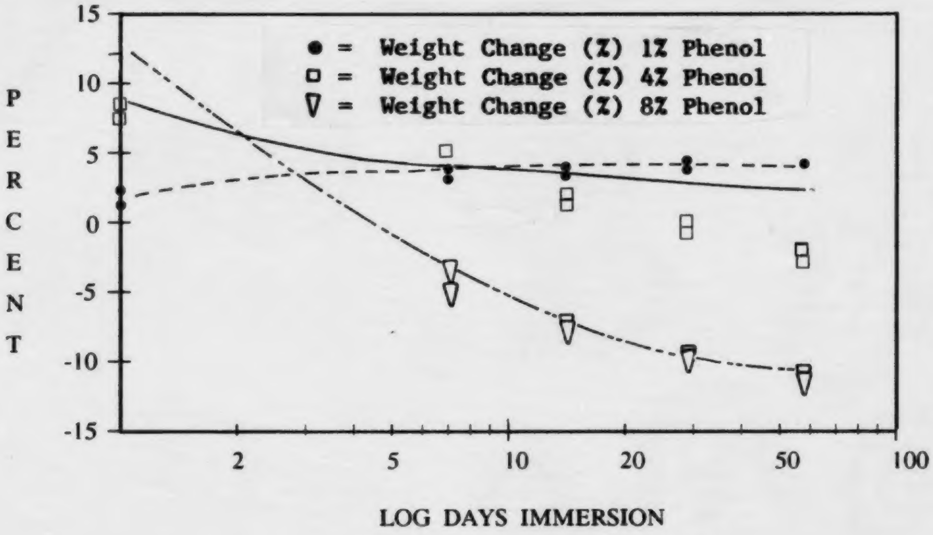


Figure 23. Weight change with immersion in phenol solution at 23°C for PVC

The PVC liner's mechanical properties also showed this combination response. Figures 24, 25, and 26 show percent weight change, percent retention of breaking factor, and percent retention of ultimate elongation with immersion time at 50°C. In Figure 24, response to a 1 percent phenol solution, a stabilized decrease in breaking strength corresponds to the moderate weight gain. Elongation is not significantly affected. In a 4 percent solution (Figure 25), the initial weight gain recedes with time. The corresponding initial loss of breaking strength (from softening due to absorption) is recovered and breaking strength increases with time. Elongation still shows no significant change. The liner response to an 8 percent solution (Figure 26) shows the continuation of these trends. The initial weight gain (and initial loss of strength) becomes a weight loss (and increase in strength). In 8 percent phenol, however, an additional effect is apparent: the elongation at break has decreased after a two-year exposure, another sign of stiffening and possible eventual embrittlement.

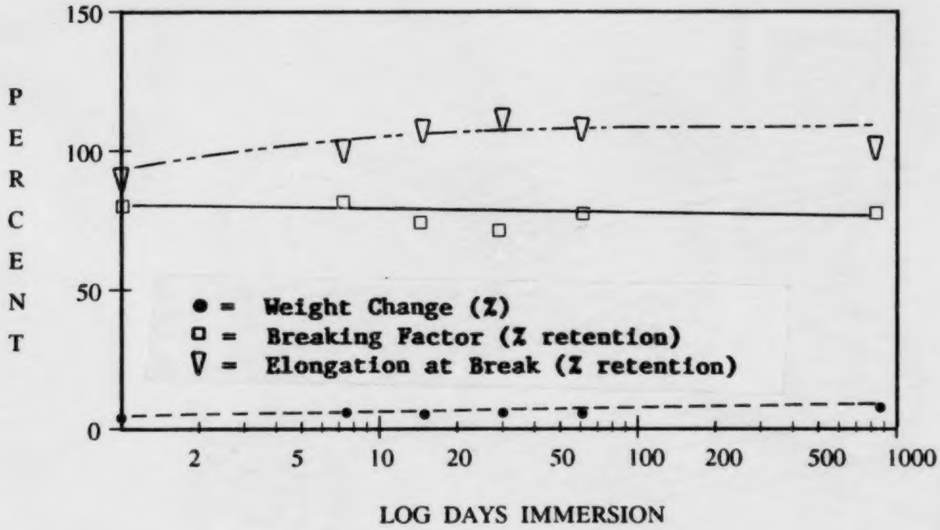


Figure 24. Physical property change with immersion in 1 percent phenol solution at 50°C for PVC

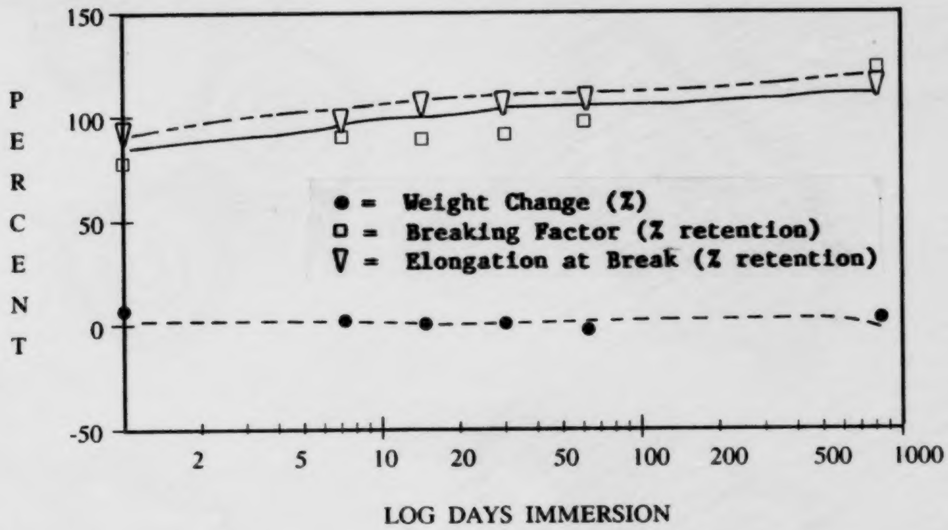


Figure 25. Physical property change with immersion in 4 percent phenol solution at 50°C for PVC

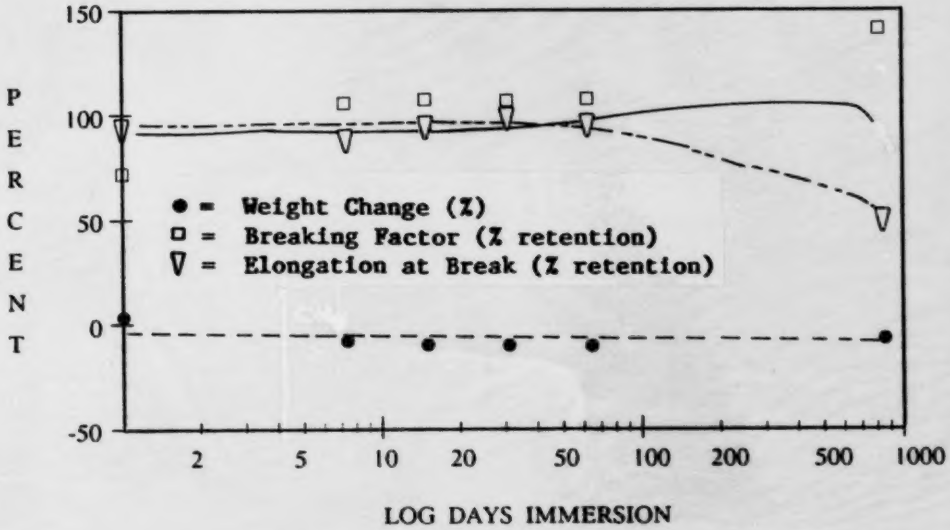


Figure 26. Physical property change with immersion in 8 percent phenol solution at 50°C for PVC

CHLORINATED POLYETHYLENE (CPE)

Criteria for Determining FML Chemical Resistance

For this CPE liner, based on the overall data in this project, the following criteria are proposed for determining CPE chemical resistance with immersion tests:

- Stability of weight change and mechanical properties with time.
- A stabilized weight gain of not more than 25 percent for immersion testing conducted at 23°C.
- The breaking factor must be at least 75 percent of the initial value and equal to or greater than the minimum as-received value in the material properties table of NSF Standard 54 for the appropriate thickness.
- The percent elongation at break must be at least 70 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.
- The S-100 modulus must be at least 70 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.
- The tear resistance must be at least 70 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.

These criteria are used in evaluating the FML's response to the chemicals in Table 26. Table 26 is a summary of the results of chemical resistance testing for CPE liner, and the table is explained and amplified in the sections that follow. The chemicals listed in Table 26 are grouped according to the type of response seen. Resistance or non-resistance is listed in the second to last columns, and the reasons for a non-resistance rating are given in the last column. Also listed in the table are whether temperature and concentration effects were seen, whether the liner achieved stability in contact with the chemical exposure, and whether the CPE is considered resistant to the chemical exposure.

Table 26. CHLORINATED POLYETHYLENE (CPE): RESPONSE SUMMARY FOR CHEMICAL RESISTANCE

CHEMICAL NAME	CHEMICAL TYPE	TEMPERATURE EFFECT	CONCENTRATION EFFECT	TYPE OF RESPONSE	CONDITIONS	STABILITY ACHIEVED~	RESISTANT~	REASONS FOR NON-RESISTANCE *
Water	-	yes	-	Loss of Elongation at 50 C	23 C -	Y	Y	
					50 C	Y	N	(WG) EL
Sodium Chloride	SALT	no	no	Minor Loss of Elongation at 50 C	23 C 10% &	Y	Y	
					50 C sat'd	Y	Y	
Potassium Dichromate	OXIDIZER	yes	-	Minor Loss of Elongation at 50 C	23 C 10%	Y	Y	
					50 C	Y	Y	
Hydrochloric Acid	ACID	yes	-	Loss of Elongation at 50 C	23 C 10%	Y	Y	
					50 C	Y	Y	EL(m)
Furfural	ALDEHYDE	yes	yes	Swelling and Softening	23 C 1%	N	N	S, WG, TL(m), SL
					4%	N	N	S, WG, BL, TL, SL
					8%	Y	N	WG, BL, TL, SL
				Loss of Elongation at 50 C	50 C 1%	N	N	S, WG, BL, TL(m), SL
					4%	Y	N	WG, BL, TL, SL, EL
					8%	Y	N	WG, BL, TL, SL, EL
1,2-Dichloroethane	CHLORINATED HYDROCARBON	yes	yes	Swelling and Softening	23 C .1%	Y	N	BL(m), TL, SL
					.5%	N	N	WG, BL, TL, SL
					.8%	N	N	WG, BL, TL, SL
					50 C .1%	Y	N	WG, TL(m), SL, EL
					.5%	Y	N	WG, BL, TL, SL, EL
					.8%	Y	N	WG, BL, TL, SL
Sodium Hydroxide	BASE	yes	-	Minor Loss of Elongation at 50 C	23 C 10%	Y	Y	
					50 C	Y	Y	
ASTM #2 Oil	OIL	yes	-	Minor Loss of Elongation at 50 C	23 C 100%	Y	Y(m)	BL(m), SL(m)
					50 C	Y	Y(m)	BL(m), SL(m), EL(m)
Methyl Ethyl Ketone	KETONE	yes	yes	Swelling and Softening	23 C 3%	Y	N	WG, BL, TL(m), SL
					13%	Y	N	WG, BL, TL, SL
					26%	Y	N	WG, BL, TL, SL
					50 C 3%	Y	N	WG, BL, TL(m), SL
					13%	Y	N	WG, BL, TL, SL
					26%	Y	N	WG, BL, TL, SL, EL
Phenol	PHENOL	yes	yes	Swelling and Softening	23 C 1%	N	N	WG, BL(m), SL
					4%	N	N	WG, BL, TL, SL
					8%	Y	N	WG, BL, TL, SL
					50 C 1%	N	N	WG, TL(m), SL, EL
					4%	N	N	WG, BL, TL, SL
					8%	Y	N	WG, BL, TL, SL

* S = No Stability, WG = weight gain, BL = Breaking Factor Loss, EL = Elongation at Break Loss,
TL = Tear Resistance Loss, SL = S-100 Loss (m) = Marginal or borderline results

~ Y = Yes, N = No, (v) = variable results due to volatility of chemical

The suggested criteria for mechanical properties are based on the limits of material variability seen for this CPE liner. Although significant increases in elongation were seen as a result of some chemical exposures, it was not possible to set an upper limit for change in this property. The increased elongation did not correlate well with strength or weight gain, and appeared to be a result of variability within the liner. Limits on weight change are specified for a 23°C immersion temperature. This was necessary since the weight gain was strongly temperature-dependent.

The suggested criteria for S-100 modulus and elongation agree with those proposed by the EPA in the document "Resistance of FML's to Chemicals and Wastes"(27). Tear resistance was not included in the EPA list. The EPA criteria lists ten percent as the limit for weight gain, with the exception of water, and notes that weight gains of more than ten percent in water did not correspond to decrease in mechanical properties. Limits on breaking factor were set at 75 percent retention in this project rather than the 80 percent retention listed in the EPA document to reflect the test reproducibility. This would not result in any difference in the number of exposures rated as non-resistant for this project.

CPE resistance ratings are listed in the EPA matrix for five of the chemicals tested in this project. Four of the five ratings given agree with ratings derived using the proposed criteria with project data (phenol, HCl, salt, and water). CPE was rated as non-resistant to NaOH (30 percent) in the matrix, based on weight change data. Table 27 compares the two sets of weight data (NSF and matrix reference). NSF weight change results are much lower, and no significant changes were observed in the liner's mechanical properties. The difference in ratings is probably a function of concentration (10 percent in this study, <30 percent in the EPA matrix).

Agreement between percentage change criteria and absolute minimum property values (using Standard 54 tables) was quite good. The absolute limit for breaking factor, though, was more stringent than the percentage change criteria for breaking factor because this CPE liner has much less strength in the transverse direction.

TABLE 27. COMPARISON OF MANUFACTURER'S DATA TO NSF DATA FOR CPE RESISTANCE TO NaOH.

DAYS IMMERSION	PERCENT WEIGHT CHANGE	
	Matrix Reference	NSF Data
	(24°C, < 30 percent NaOH)	(23°C, 10 percent NaOH)
1		0.3
3	3.0	
7		0.8
11	8.0	
14		1.0
28		1.6, 1.7
56		
		2.4
81	15.6	
144		
		1.8
238		1.1
368		1.0
510		0.7
622		0.2
732		0.3

Two limitations in the proposed criteria for CPE chemical resistance are temperature and permeability. First, the effect of temperature on chemical resistance is especially significant for CPE. No service temperature limits can be proposed since only two temperatures were used for immersion testing, but service at 50°C does not appear to be suitable for CPE.

Also, these tests do not address the permeability of the liner. Permeability is an important functional parameter for all FMLs used in waste containment applications. Haxo et al. tested the permeability of several FMLs exposed to acidic waste. He found that the permeability of the CPE liner increased with time on exposure to the waste, probably due to high water absorption (29).

Response Time and Stability

The FML response to the chemical immersion must stabilize in order for it to be considered chemically resistant. Response time, or the time required for the liner to stabilize in a given solution, varied from less than one month to more than five hundred days for CPE.

Significant weight changes (large enough to correspond with changes in breaking strength) were usually evident within a two-month test period, although weight often continued to increase. Breaking strength and tear resistance stabilized faster than weight change, usually within two months. Slow changes in elongation at break and S-100 modulus were sometimes evident up to the two-year exposure.

Magnitude of Liner Response

A two-part evaluation of the magnitude of physical property change was followed in determining CPE chemical resistance. Both an absolute minimum value for a mechanical property (for example, elongation at break) and an allowable percent change of that property (from the initial value) were determined.

The range of changes seen in the CPE liner was large. No losses in weight were seen, but weight gain varied overall from less than one percent to over three hundred percent, depending on the exposure conditions. Exposure to water at 23°C and 50°C caused CPE weight gains of 19 and 90 percent within two years, respectively. Weight gains seen in hydrochloric acid, salt, potassium dichromate, sodium hydroxide, and ASTM #2 oil were less than those in water at each temperature. The reduced liner swelling in ionic solutions is probably caused by the liner's inability to overcome the hydration energy of the inorganic solute. This phenomenon was typical for all liners. MEK, DCE, furfural, and phenol solutions caused weight gains larger than in water and dependent on concentration and temperature.

Changes in the mechanical properties of the CPE liner in general corresponded to weight changes. Losses in breaking strength from zero to 99 percent (saturated MEK at 50°C) were observed. Change in elongation at break was both positive and negative, and became extremely variable in some exposures. Retention of intial elongation ranged from 42 to 254 percent.

Absolute Amount—

Because the CPE liner is strongly anisotropic, the values for mechanical properties in each direction were evaluated. The NSF Standard 54 CPE material property table was used for the minimum absolute values.

Using the Standard 54 values, all four organic solvents are considered non-resistant at all three concentrations. While for the most dilute concentrations, properties in the machine direction were above Standard 54 values, the transverse direction values fell below Standard 54. Marginal results were obtained for some transverse direction samples exposed to ASTM #2 oil, oily water, salt, water, and dichromate solutions. Physical properties of CPE should be measured in the transverse direction as a minimum.

Percent Change from Initial Value—

Figure 27 shows the relationship between breaking factor retention and weight change for machine direction samples. Breaking factor variability in this CPE liner was approximately ± 20 percent, measured by looking at those samples with little or no weight change. (Variability in the transverse direction was similar.) A limit on change of 25 percent was chosen as a conservative estimate of real material degradation.

Retention of ultimate elongation (machine direction) is shown as a function of weight change in Figure 28. Exposure to fluids tended to increase

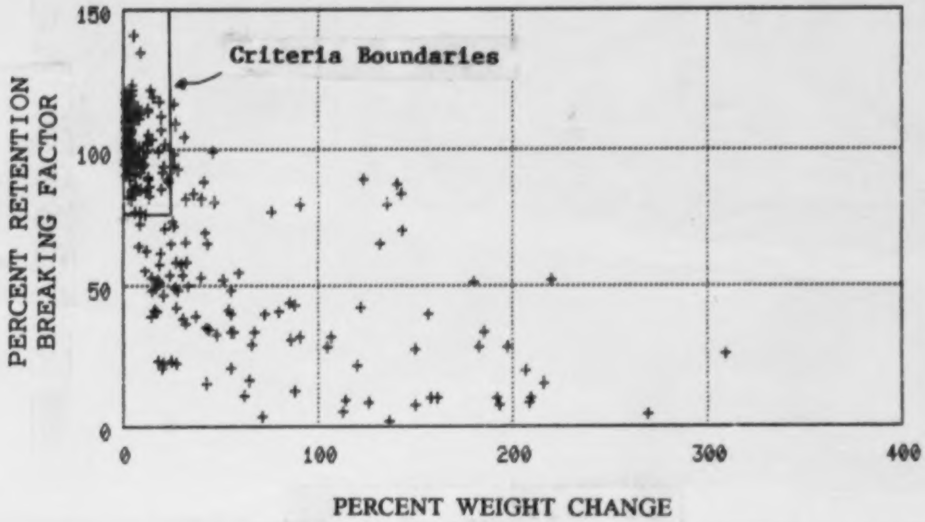


Figure 27. Relationship of breaking factor and weight change for CPE

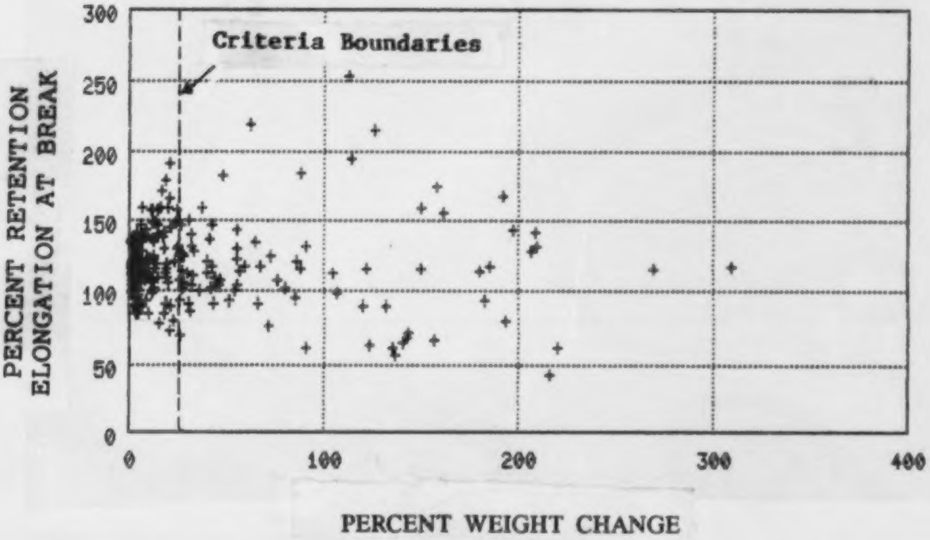


Figure 28. Relationship of elongation at break and weight change for CPE

CPE elongation, however, even for small weight change, and elongation became extremely variable for some chemical exposures.

No limits on increase in elongation can be set from the data. Decreases in elongation with time were usually associated with exposure at 50°C, and were apparent only after a two-year immersion period. A 30 percent decrease in elongation retention was chosen as evidence of degradation.

A limit for decrease in the S-100 modulus was set at 70 percent of initial based on the variability shown in Figure 29. (This figure shows the machine direction, but variability was similar in the transverse direction.) For tear resistance, the same 30 percent limit was set. Variability in tear resistance was about 25 percent in the machine direction and 20 percent in the transverse direction.

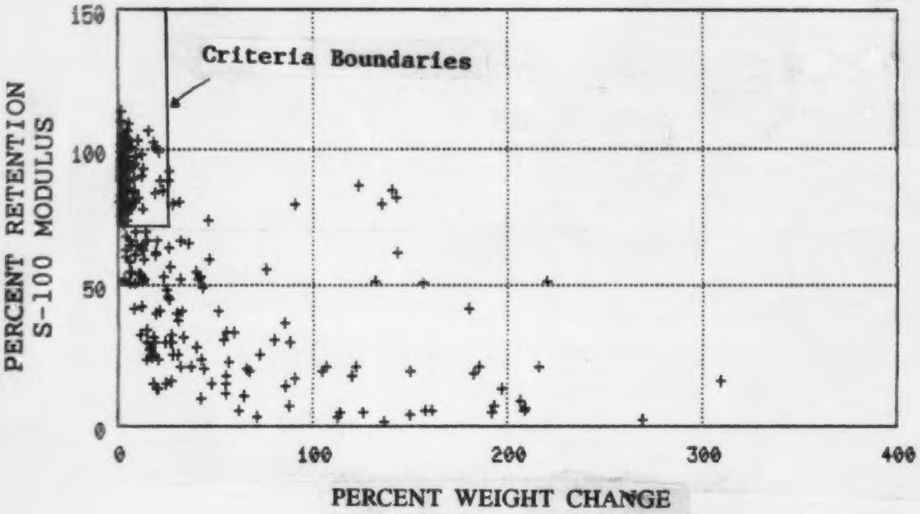


Figure 29. Relationship of S-100 modulus and weight change for CPE

A limit for allowable stabilized weight gain for this CPE liner was set at 25 percent for 23°C immersion tests. This limit is comparable to the weight gain seen in water at 23°C, for which no significant changes in physical properties were seen. It must be emphasized that weight change alone cannot determine chemical resistance for CPE. Absorption of water may cause no change in physical properties, while a comparable weight gain caused by absorption of solvent can cause softening. This was seen in CPE on exposure to 0.1 percent DCE at 23°C. While the increase of weight was 22 percent (compared to 19 percent for water), the retention of S-100 modulus was only 65 percent (compared to 96 percent for water).

Types of Effects

The results in Table 26 for this thermoplastic CPE liner are grouped according to the type of effects seen. Temperature and concentration effects are noted in the third and fourth columns. Three basic types of response to chemical immersion were observed with this liner: minor change, degradation due to temperature, and swelling and softening (sometimes accompanied by degradation due to temperature).

Temperature Effects—

The response of this liner to increased immersion temperature shows that an elevated temperature is not suitable for accelerated testing. Significant effects were caused by temperature alone at 50°C. The CPE liner stretched in the transverse direction and shrank in the machine direction in nearly all high temperature exposures. Also, weight gain was considerably more for most 50°C samples than for the corresponding 23°C samples.

Another temperature-related change seen in the CPE was a decrease in the amount of elongation at break after a two year immersion period. Samples immersed in 50°C water lost 39 percent of their elongation after two years, compared to an 8 percent for corresponding samples at 23°C. This loss of elongation at 50°C was seen in the inorganic solutions, oil, furfural, and the lower concentrations of the other organic solutions. The most severe losses were seen in those solutions most like water (i.e. low organic chemical concentration and/or low ionic strength). This loss of elongation appears to be related to the amount of weight change (water or chemical absorption) as well. CPE samples immersed in salt or caustic solutions gained less weight than those in water.

Concentration Effects--

Four organic chemicals were tested in three concentrations. All responses seen with these chemicals were affected by concentration. Percent weight gain increased with increasing solution concentration. Strength, modulus, and tear resistance all decreased with increasing solution concentration.

Indicators of Non-Resistance

For this CPE liner, the most important indicators of non-resistance were weight change, S-100 modulus, breaking strength, and elongation at break. Tear resistance generally followed the same trend as breaking strength, and volume change (swelling) corresponded to weight change.

In general, an increase in sample weight indicated a change in mechanical properties for CPE. When weight gain was due primarily to absorption of organic solvents, strength and modulus were less than initial values. When weight gain was due primarily to absorption of water at 50°C, elongation at break showed long-term deterioration.

The S-100 modulus was a more sensitive indicator of solvent absorption and softening than the breaking factor for CPE. In the same example immersion discussed in the previous section (0.1 percent DCE at 23°C), the retention of S-100 modulus stabilized at 65 percent, while the breaking strength stabilized at 91 percent retention. Since softening may indicate an increase in permeability or a decrease in puncture resistance, the sensitivity of the S-100 modulus is important in chemical resistance evaluation. Also, an increase in S-100 modulus was seen in some samples after a two-year immersion (a recovery from an initial decrease), which could indicate stiffening and possibly crosslinking of the CPE.

While breaking factor is not as sensitive an indicator, it is still useful for evaluating CPE chemical resistance.

Elongation at break is the least sensitive measurement for short-term immersion testing. With this CPE liner, elongation became extremely variable with exposure to organic chemicals, especially furfural. Within a group of five test specimens cut from the same exposed coupon, elongation could vary from 400 percent to over 1000 percent (of initial grip separation). This in itself is an indication of chemical effect on the liner, but quantitative interpretation of results is difficult.

After a two-year immersion period, however, elongation is a better indicator of material change. Especially at the higher temperature, CPE elongation was often significantly less than its initial value, indicating material degradation. Since this decrease in elongation was sometimes accompanied by a recovery of the modulus, it may be an indicator of stiffening and/or crosslinking.

Minor Change—

The following 23°C exposures produced only minor changes in CPE weight and mechanical properties: water, sodium hydroxide, hydrochloric acid, salt, potassium dichromate, ASTM #2 oil, and water with ASTM #2 oil added. An example is shown in Figure 30. This figure shows the response of the CPE liner to a saturated salt solution at 23°C. Weight gain is less than three percent over the two-year period. Breaking strength was not affected, nor was the S-100 modulus (not shown). Although the elongation at break was initially increased by contact with the solution, it is nearly at its initial value after two years.

Degradation due to temperature—

As previously discussed, degradation in CPE material properties was caused by exposure to 50°C solutions. While weight gain and elongation at break are the best indicators for this effect, breaking strength sometimes also is decreased. Figures 31 and 32 compare the response of the CPE liner to water at 23 and 50°C. In Figure 30, a moderate gain in weight (absorption of water) is seen. Breaking factor is unchanged, and elongation shows approximately 8 percent decrease after two years.

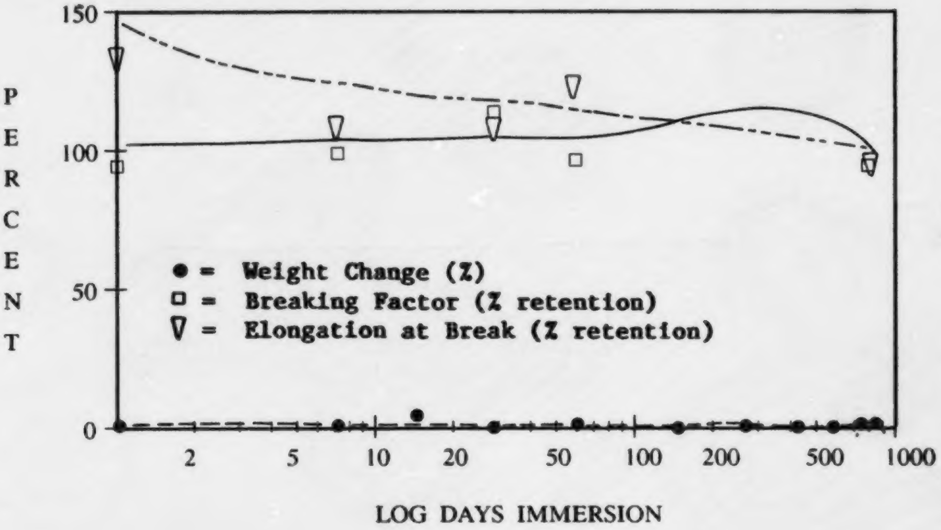


Figure 30. Physical property change with immersion in saturated (35 percent) salt solution at 23°C for CPE

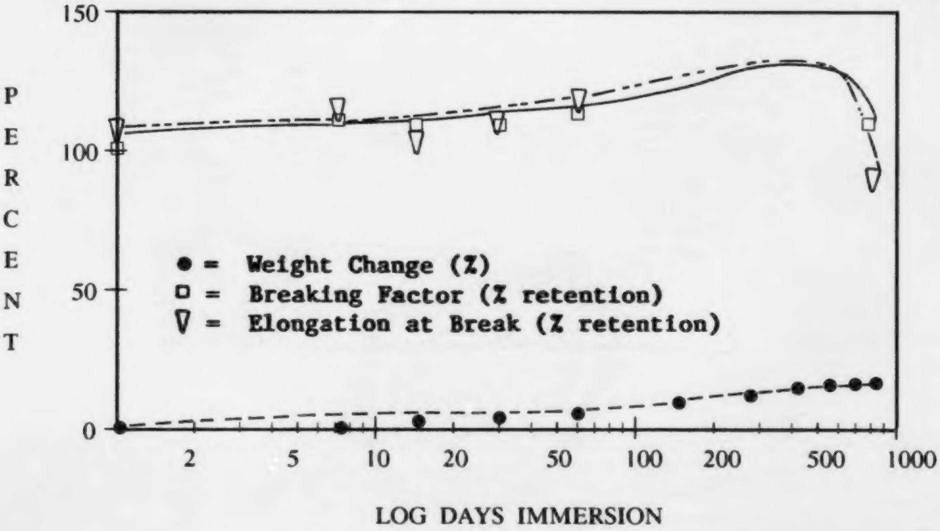


Figure 31. Physical property change with immersion in water at 23°C for CPE

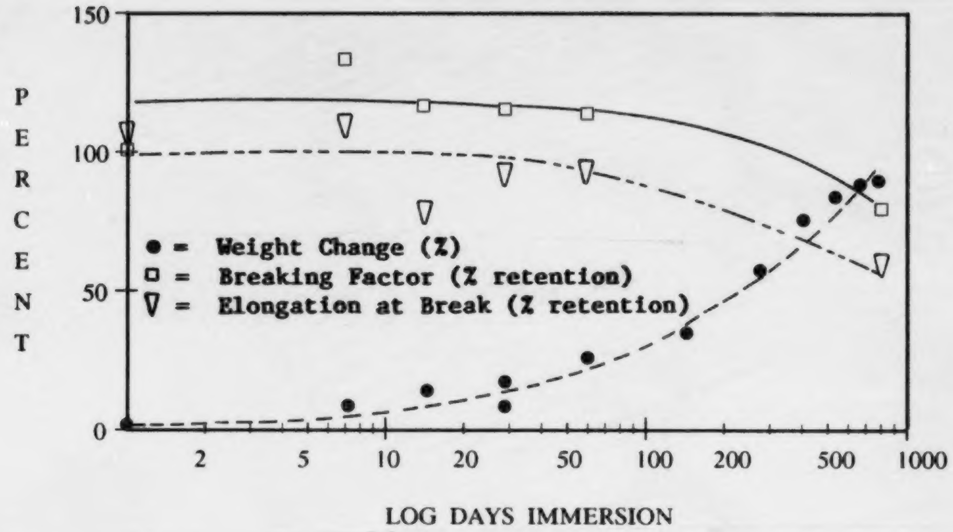


Figure 32. Physical property change with immersion in water at 50°C for CPE

At 50°C (Figure 32), however, the changes in CPE properties are more severe. Weight gain is more than four times the gain at 23°C. Both breaking strength and elongation are less than initial values after two years exposure.

Swelling and softening (sometimes accompanied by temperature degradation)—

The CPE response to organic solutions (phenol, furfural, MEK, and 1,2-dichloroethane) was primarily one of swelling and softening. The degree of the response was dependent on the chemical concentration in all cases. Breaking strength, S-100 modulus, and tear resistance decreased to some degree in all samples exposed to these chemicals. As shown in Table 26, CPE was rated as non-resistant to all concentrations of these four chemicals. Also observed in some exposures was an increase in elongation at break, and a greatly increased variability in the elongation results.

These effects are illustrated in Figures 33-38. These figures show the response of the CPE liner to solutions of furfural in water. Weight change, retention of breaking strength and retention of elongation at break are shown as a function of immersion length. Figures 33-35 show results for 23°C exposures, and 36-38 for 50°C exposures. Note that weight gains increase with concentration and with temperature. Variability in weight measurements is

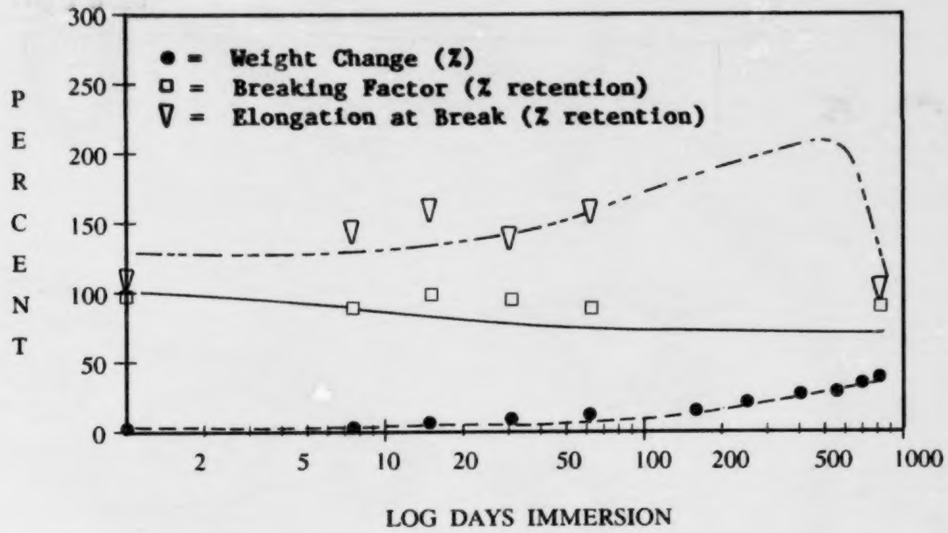


Figure 33. Physical property change with immersion in 1 percent furfural solution at 23°C for CPE

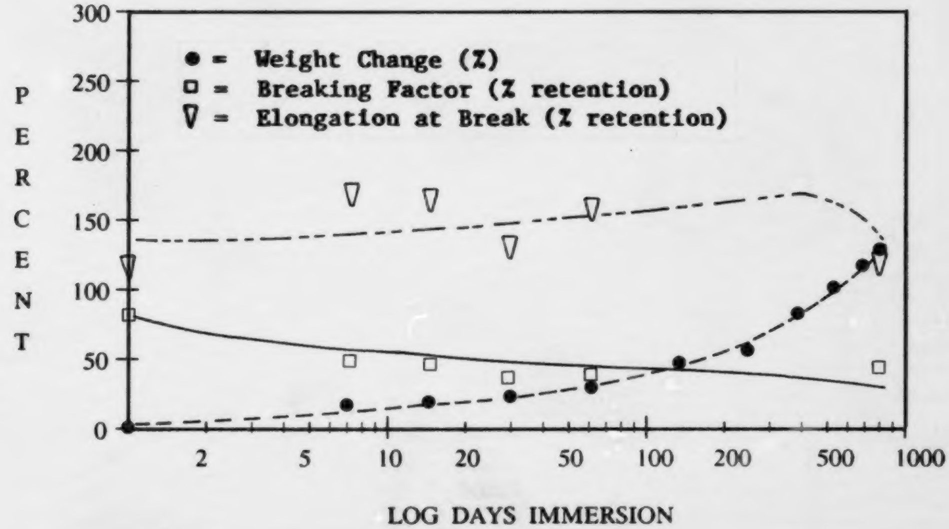


Figure 34. Physical property change with immersion in 4 percent furfural solution at 23°C for CPE

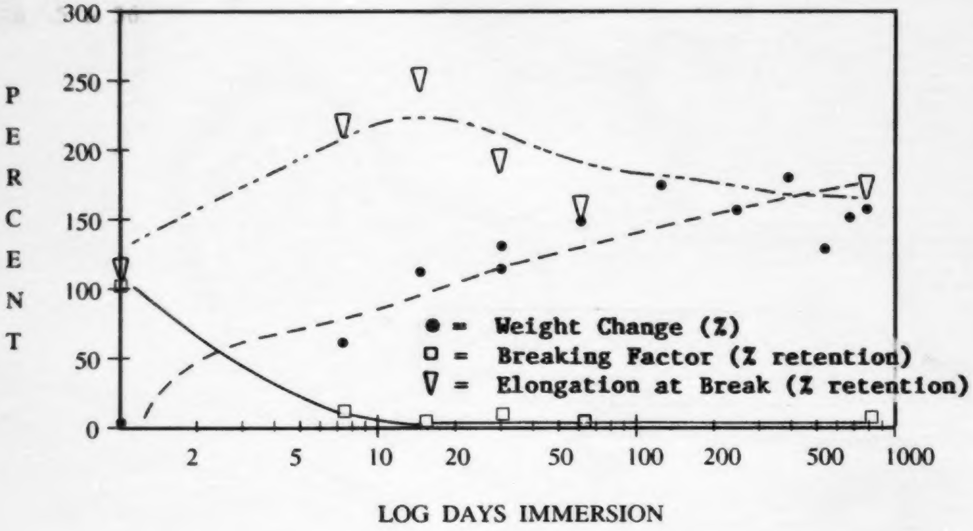


Figure 35. Physical property change with immersion in 8 percent furfural solution at 23°C for CPE

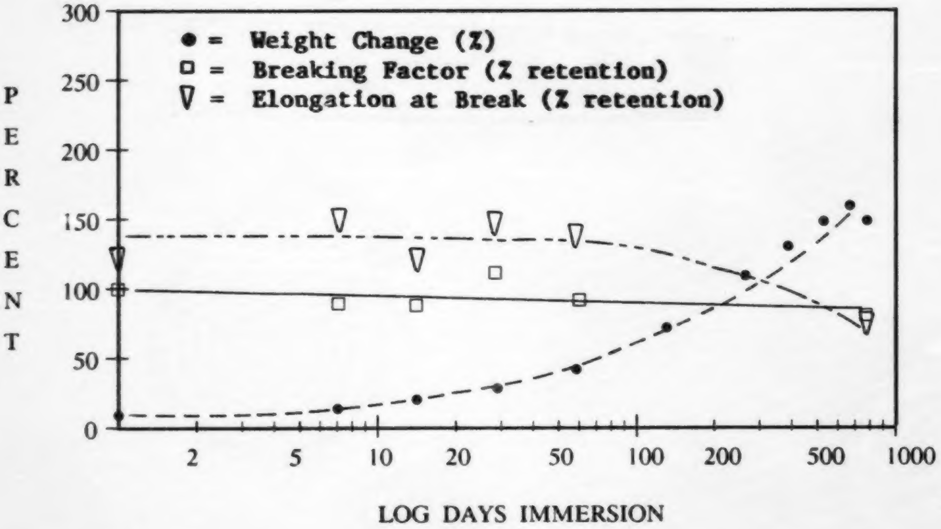


Figure 36. Physical property change with immersion in 1 percent furfural solution at 50°C for CPE

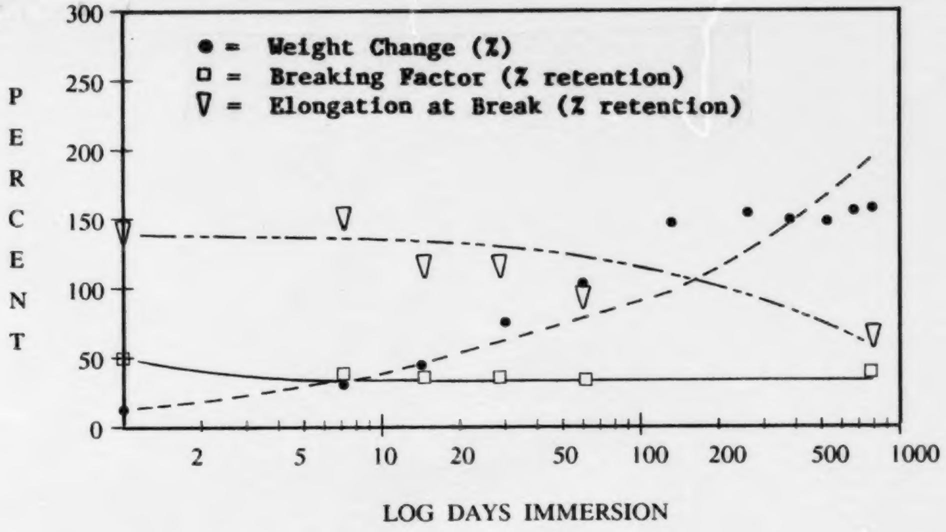


Figure 37. Physical property change with immersion in 4 percent furfural solution at 50°C for CPE

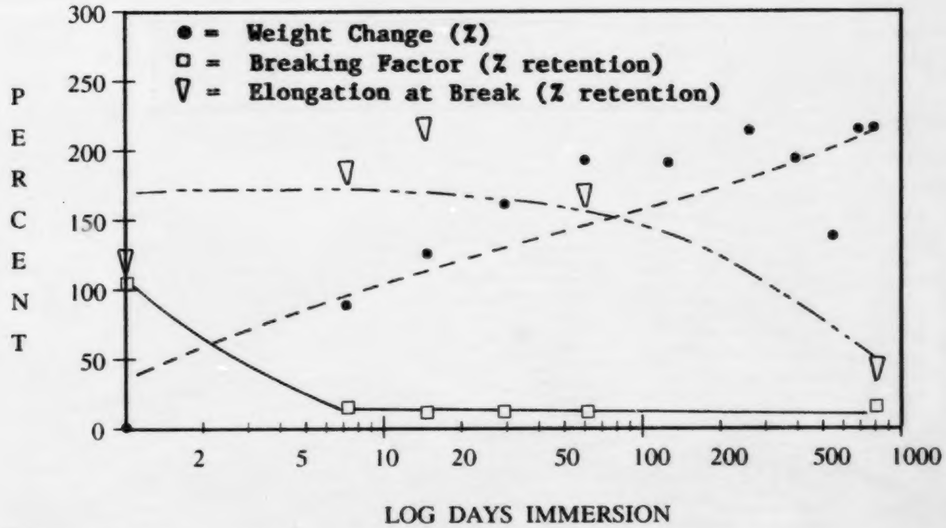


Figure 38. Physical property change with immersion in 8 percent furfural solution at 50°C for CPE

highest at the highest concentration (8 percent). Weight stability is achieved in the 8 percent solution at both temperatures after 100 days and in the 4 percent solution at 50°C only (Figures 35, 37, and 38).

The loss in breaking strength is clearly dependent on solution concentration, although the strength appears to stabilize in all exposures. Nearly complete loss of strength is seen in CPE exposed in 8 percent furfural solutions.

Variability in elongation at break is particularly evident in Figure 35. Sample elongation was as much as 250 percent (average of five specimens) of its initial value; there were large differences in elongation between adjacent specimens of the same sample, cut from the same area of the liner material. These differences were as high as ± 37 percent of the average percent value.

The effect of temperature on elongation can be seen by comparing Figures 35 and 38. After two year's immersion time, the sample exposed at 50°C retains less than 50 percent of initial elongation, while the sample exposed at 23°C retains more than 150 percent of the initial value. Crosslinking of the CPE polymer is a possible cause of this decrease in elongation in response to heat, but it is clearly accompanied by liner degradation, as evidenced by the large weight gains and losses in strength.

ETHYLENE PROPYLENE DIENE MONOMER (EPDM)

Criteria for Determining FML Chemical Resistance

For EPDM liner, based on the overall data from this project, the following criteria are proposed for determining chemical resistance of EPDM with immersion tests:

- Stability of weight change and mechanical properties with time.
- A stabilized weight gain of not more than 30 percent.
- The breaking factor must be at least 80 percent of the initial value and

also equal to or greater than the minimum as-received value in the material properties table of NSF Standard 54.

- The percent elongation at break must be at least 75 percent of the initial value and also equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.

These criteria are used in evaluating the FML's response to the chemicals in Table 28. Table 28 is a summary of the results of chemical resistance testing for EPDM liner, and the table is explained and amplified in the sections that follow. The chemicals listed in Table 28 are grouped according to the type of response seen. Resistance or non-resistance is listed in the second to last columns, and the reasons for a non-resistance rating are given in the last column. Also listed in the table are whether temperature and concentration effects were seen, whether the liner achieved stability in contact with the chemical exposure, and whether the EPDM is considered resistant to the chemical exposure.

Response Time and Stability

Response time, or the time required for the liner to stabilize in a given solution, ranged from less than one month to more than two years for EPDM. The rate of weight change was different for different chemical exposures, but can be divided roughly into two categories. In the first group, weight gain stabilized within 250 days: water, salt, dichromate, sodium hydroxide, DCE, ASTM #2 oil, and MEK. In the second group, stabilization took 500 days or more: hydrochloric acid, furfural, and phenol.

EPDM immersion tests need to be longer than two months in duration. Few significant changes in mechanical properties were seen within a two-month period. With the exception of ASTM #2 oil, exposures that caused large eventual weight gain and loss of mechanical properties acted slowly. At least eight months is needed to determine EPDM chemical resistance from immersion testing.

Table 28. ETHYLENE PROPYLENE DIENE MONOMER (EPDM): RESPONSE SUMMARY FOR CHEMICAL RESISTANCE

CHEMICAL NAME	CHEMICAL TYPE	TEMPERATURE EFFECT	CONCENTRATION EFFECT	TYPE OF RESPONSE	CONDITIONS		STABILITY ACHIEVED~	RESISTANT~	REASONS FOR NON-RESISTANCE *
Water	-	yes	-	Minor Change	23 C	-	Y	Y	
					50 C	-	Y	Y	
Sodium Chloride	SALT	no	no	Minor Change	23 C	10% &	Y	Y	
					50 C	sat'd	Y	Y	
Potassium Dichromate	OXIDIZER	yes	-	Minor Change	23 C	10%	Y	Y	
					50 C		Y	Y	
Sodium Hydroxide	BASE	no	-	Minor change	23 C	10%	Y	Y	
					50 C		Y	Y	
ASTM #2 Oil	OIL	yes	-	Rapid weight gain	23 C	100%	Y	N	WG, BL, EL
					50 C		Y	N	WG, BL, EL
1,2-Dichloroethane	CHLORINATED HYDROCARBON	yes	yes	Rapid weight gain (weight loss in pure chemical)	23 C	.1%	Y	Y	
						.5%	Y	Y	
						.8%	Y	Y	
					50 C	.1%	Y	Y	
						.5%	Y	Y	
						.8%	Y	Y	
Methyl Ethyl Ketone	KETONE	yes	yes	Rapid weight gain (weight loss in pure chemical)	23 C	3%	Y	Y	
						13%	Y	Y	
						26%	Y	Y	
					50 C	3%	Y	Y	
						13%	Y	Y	
						26%	Y	N	BL
Hydrochloric Acid	ACID	yes	-	Slow weight gain	23 C	10%	Y	Y	
					50 C		Y	N	WG, BL, EL
Furfural	ALDEHYDE	yes	yes	Slow weight gain	23 C	1%	Y	Y	
						4%	N	N	S,
						8%	N	N	S, EL
					50 C	1%	Y	Y	WG (marginal)
						4%	N	N	S
						8%	N	N	S, WG, BL, EL
Phenol	PHENOL	no	yes	Slow weight gain	23 C	1%	Y	Y	
						4%	N	N	S
						8%	N	N	S
					50 C	1%	N	N	S
						4%	N	N	S
						8%	N	N	S

* S = No Stability, WG = weight gain, WL = weight loss, BL = Breaking Factor Loss, EL = Elongation at Break Loss,
~ Y = Yes, N = No

Magnitude of Liner Response

A two-part evaluation of the magnitude of physical property change was followed in determining EPDM chemical resistance. Both an absolute minimum value for a mechanical property (for example, elongation at break) and an allowable percent change of that property (from the initial value) were determined.

Both weight gain (indicative of absorption of chemical or water) and weight loss were observed in testing EPDM. Weight loss was seen only in the initial screening tests, on exposure to neat or concentrated chemicals. The EPDM showed a dried weight loss of 22 percent for pure DCE, 21 percent for pure MEK, 3 percent for pure furfural, and 2 percent for liquified phenol (88 percent). Those samples which had been in DCE and in MEK were visibly smaller and stiffer.

Weight gain varied overall from less than one percent to over one hundred percent, depending on the exposure conditions. Water, salt, potassium dichromate, and sodium hydroxide all showed only minor weight change. MEK, DCE, and phenol solutions caused weight gains of between two and sixteen percent, depending on concentration and temperature. Weight gain in furfural was strongly influenced by temperature and concentration and ranged from 3 to 91 percent. In 10 percent hydrochloric acid, the stabilized weight gains were 5 and 112 percent in low and high temperature, respectively. Weight gain in ASTM #2 oil stabilized at 90 percent at both temperatures.

Changes in the mechanical properties of the EPDM liner were similar. The largest losses in breaking strength were observed after exposure to hydrochloric acid at 50°C (up to 50 percent loss), ASTM #2 oil (up to 53 percent loss), and furfural (up to 29 percent loss). Loss in ultimate elongation was most severe for the same three chemicals (71 percent, 30 percent, and 58 percent loss, respectively).

Absolute Amount--

The Standard 54 minimum properties for EPDM are used as the limits for absolute amount of change. The Standard 54 values are not normalized for thickness. EPDM must be normalized to interpret immersion results because of the variable thickness of EPDM and the correlation between thickness and strength. For breaking factor, some samples exposed to ASTM #2 oil, hydrochloric acid (50°C only), and saturated furfural fell below the 42 lb/inch limit.

Some samples exposed to ASTM #2 oil and some exposed to hot hydrochloric acid (50°C only) were below the Standard 54 limit of 300 percent for percent elongation at break. Only one sample exposed to ASTM #2 oil fell below the Standard 54 limit of 4 lb for tear resistance.

Percent Change from Initial Value--

Figure 39 shows the relationship between breaking factor and weight change. To minimize the effect of liner thickness, both the breaking strength and the weight change are normalized for sample thickness by dividing by the initial sample thickness. (Each 500 percent weight change per inch thickness is equivalent to a 15 percent weight change in a 30 mil liner.) Breaking factor reproducibility for EPDM was approximately ± 15 percent. A limit on change of 20 percent was chosen as a conservative estimate of real material degradation.

Retention of ultimate elongation is shown as a function of weight change in Figure 40. Again, the weight change is normalized for thickness. Variability in elongation is about ± 20 percent, and a limit of 25 percent was chosen as evidence of degradation.

A limit for allowable stabilized weight gain for this EPDM liner was set at 30 percent for a 30 mil liner (1000 percent per inch thickness). This limit was set using Figures 39 and 40, and correlating the weight gain at which the mechanical properties fell below the percent change limit. The 30 percent limit is larger than the recommendations given in the Los Angeles

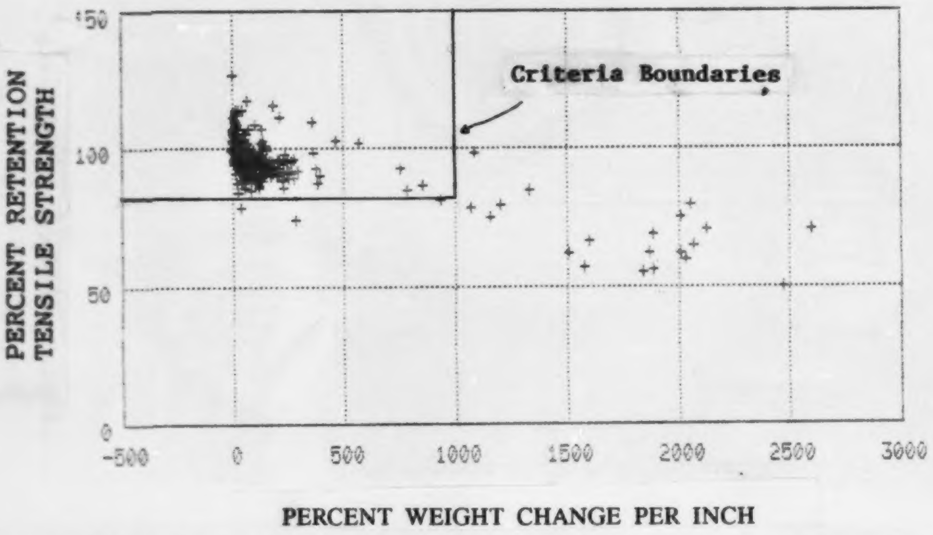


Figure 39. Relationship of tensile strength (breaking factor normalized for thickness) and weight change for EPDM

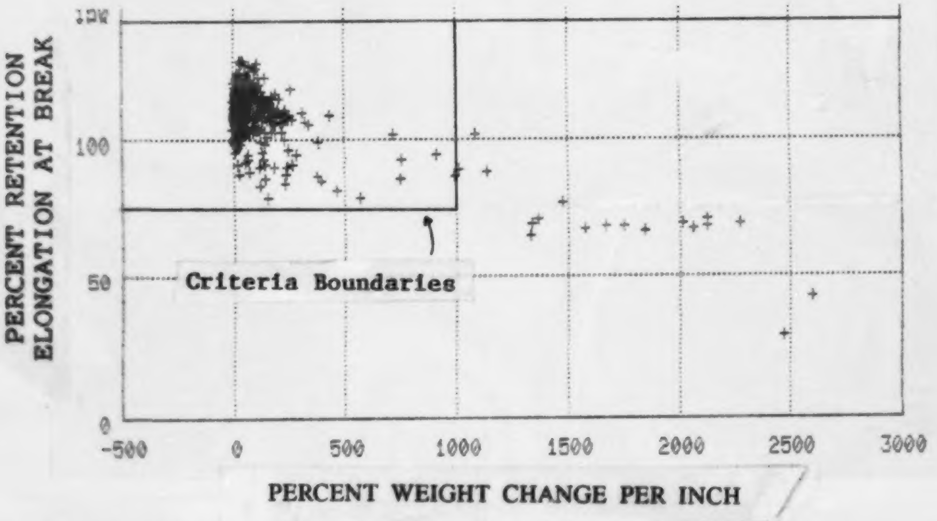


Figure 40. Relationship of elongation at break and weight change for EPDM

Rubber Group guide (23), which rates a 20 percent (volume) gain as 'not recommended'. Their more conservative limits may be based on recognizing the slow response time of some elastomers and the short duration of most immersion tests. Stability of weight change was not discussed in their publication.

No limit can be set for weight loss from the data in this project. Weight loss was only seen in initial screening tests, for which no tensile tests were performed.

Types of Effects

The different effects of chemical immersion observed in EPDM liner are shown in Table 28. A temperature or concentration effect is noted in the third and fourth columns. Four basic types of material changes were observed when EPDM liner was exposed to the immersion chemicals: shrinking and stiffening, minor change, rapid absorption of water or chemical, and slow absorption of water or chemical. These responses are listed in the fifth column.

Temperature Effects—

Increasing the immersion temperature affected nearly all the EPDM exposures. Only salt (sodium chloride) and sodium hydroxide solutions showed no difference in response due to temperature. Percent change (gain) in weight was higher at 50°C than at 23°C for all other exposures. In water, the EPDM liner gained two and five percent weight at 23 and 50°C, respectively. Mechanical properties were significantly affected by temperature in only three exposures: 10 percent hydrochloric acid, ASTM #2 oil, and furfural. (These three chemicals also caused the largest weight gains for EPDM). Increasing the temperature of exposure makes the chemical contact more aggressive, in particular with the acid exposure. But the effect of temperature per se, as measured by the water exposures, does not appear to adversely affect the crosslinked EPDM liner. Results of immersion tests accelerated by using an elevated temperature must be interpreted with caution.

Concentration Effects--

Increasing the chemical concentration increased the amount of weight gain by the EPDM liner for all four organic exposure series (MEK, furfural, DCE, and phenol). The effect of increased concentration on the liner's mechanical properties was less. Significant decrease in EPDM strength and elongation caused by increasing chemical concentration was only apparent with liner exposed to furfural. Furfural also caused much higher weight gain than the other organic solvents used.

Indicators of Non-Resistance

For this FML, the most important indicators of non-resistance are weight change, breaking strength, and elongation at break.

For immersion testing of two months or less, weight is the most sensitive indicator of material change. Even weight change, however, is not always a good indictor of possible slow changes in the EPDM liner.

Breaking strength and elongation do indicate material degradation, but these measurements are much less sensitive than weight (or volume) changes. In general, strength and elongation decreased with weight gain, but changes in these mechanical properties were significant only when the weight gain was around 30 percent.

The usefulness of tear resistance as an indicator of chemical non-resistance for EPDM could not be well evaluated in this project. Tear resistance generally followed the same trend as breaking strength, but tear resistance tests were not performed on the two-year immersion samples. Because of the slow response time of EPDM, significant changes in tear resistance were only seen from ASTM #2 oil.

Shrinking and Stiffening--

This response was observed only in the initial screening tests, on exposure to neat solvents. EPDM in contact with pure DCE and MEK was visibly smaller and stiffer after seven days immersion.

Minor Change—

Four exposure conditions produced only minor change in the weight and mechanical properties of the EPDM liner. Figure 41 shows the response to 10 percent sodium hydroxide solution at 23°C, which is typical of this category. Less than one percent change in weight occurred during the two-year immersion. Breaking strength and elongation at break were not significantly affected.

Rapid Weight Gain—

Three chemical exposures produced weight gains in EPDM which stabilized within 250 days: ASTM #2 oil, MEK, and DCE. In oil, the weight gain was large (up to 90 percent) and resulted in up to 50 percent loss of strength, and over 30 percent loss of elongation. Figures 42 and 43 show the effect of ASTM #2 oil on the EPDM liner at 23 and 50°C. The stabilized material properties were essentially the same at both temperatures, but the higher temperature exposure stabilized faster. This is an example where increasing the immersion temperature accelerated the response.

Weight changes in MEK and DCE were less and depended on temperature and concentration. Maximum weight gain for EPDM in water solutions of these chemical was 13 percent. Physical properties showed moderate decreases and were not clearly related to concentration or temperature. NOTE: These two chemicals caused significant loss of weight in their neat form. This is especially significant for DCE, with a solubility of only about 0.8 percent by weight.

Slow Weight Gain—

Three chemicals caused slow weight gain in EPDM liner: hydrochloric acid, furfural, and phenol. Weight gains in these chemicals took at least 500 days to stabilize, and some did not stabilize within the two-year immersion period. Each of these three chemicals caused unique effects in the EPDM and will be discussed separately.

In 10 percent hydrochloric acid solution, a severe temperature effect is apparent. While a slow, steady weight gain occurred at both 23 and 50°C, the resulting stabilized changes were 5 and 112 percent, respectively. Figure 44

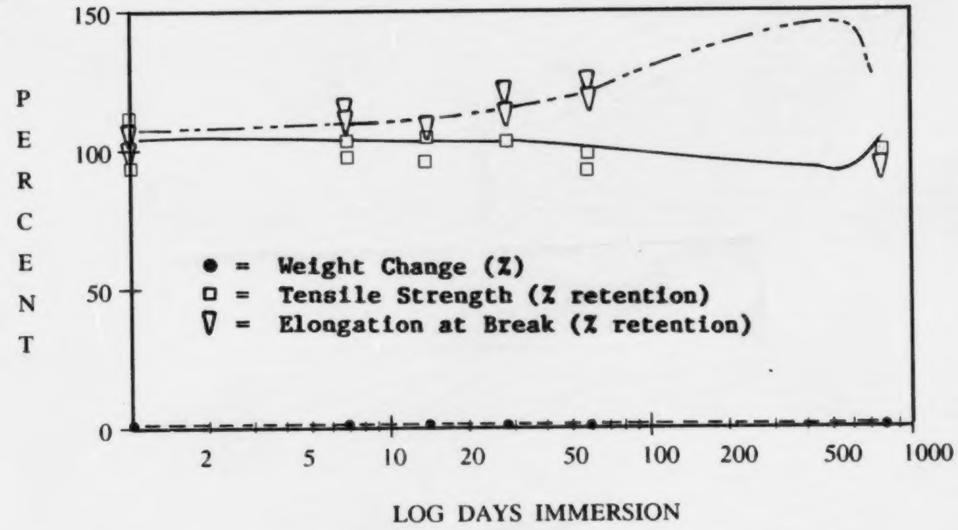


Figure 41. Physical property change with immersion in 10 percent sodium hydroxide solution at 23°C for EPDM

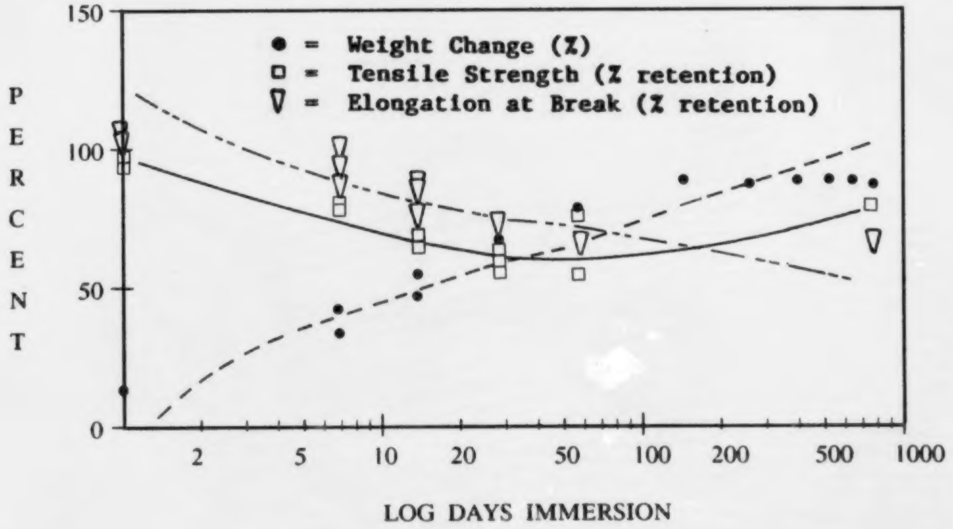


Figure 42. Physical property change with immersion in ASTM #2 oil at 23°C for EPDM

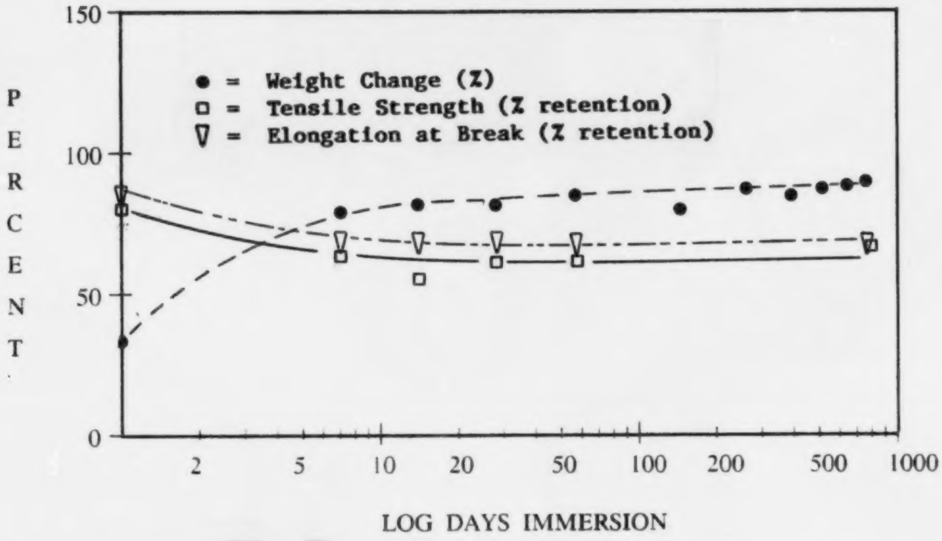


Figure 43. Physical property change with immersion in ASTM #2 oil at 50°C for EPDM

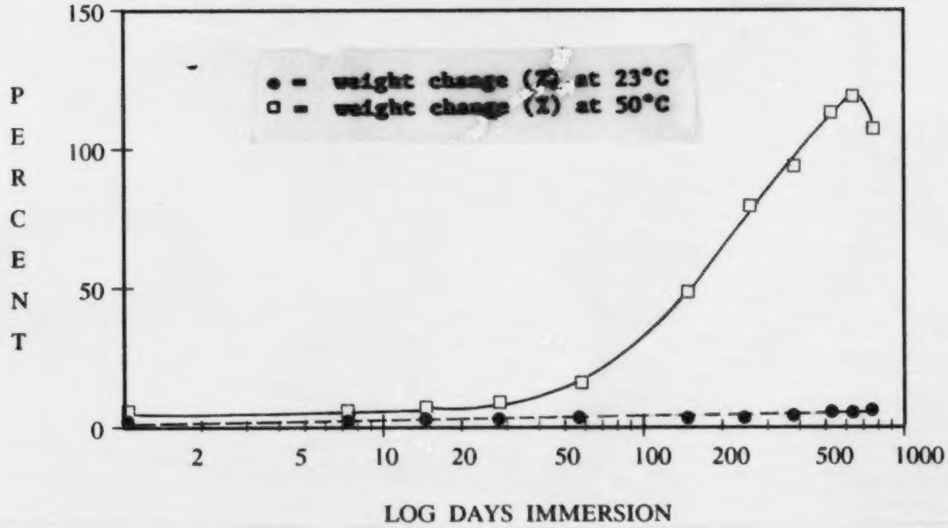


Figure 44. Percent weight change with immersion in 10 percent hydrochloric acid solution at 23°C and 50°C for EPDM

shows the difference in weight gain for the two temperatures. Differences in strength and elongation were also large for the two temperatures. After two years, the EPDM exposed at 50°C had lost 50 percent of its strength and 71 percent in elongation. Respective losses were only 12 and 9 percent at 23°C. This illustrates a case where the elevated temperature provided an environment too aggressive to serve as an accelerated test.

EPDM exposed to furfural solutions shows the clear effect of time, temperature, and chemical concentration. These effects are illustrated in Figures 45-50. Note the slow response of the EPDM liner. Weight gain begins slowly. No significant change can be seen in breaking strength or elongation during the short-term testing period (1 to 56 days). As the test progressed, however, differences in weight caused by temperature and concentration become apparent. And after two years, these weight gains are corroborated by degradation of mechanical properties. Breaking strength is less only for the saturated solutions, where weight gain was 48 percent at 23°C and 91 percent at 50°C. Elongation at break, however, decreased in all 50°C exposures and in the saturated exposure at 23°C.

The response of EPDM in furfural illustrates a situation where short-term testing is not suitable for chemical resistance determination.

The effect of phenol solutions on EPDM is much less severe after a two-year immersion period than the effect of acid or furfural. Phenol caused a slow, steady weight gain, dependent on time and temperature. The maximum weight gain in two years was only sixteen percent, however. Breaking strength and elongation showed moderate decreases (up to 17 percent loss) but were not dependent on concentration and temperature. Although significant degradation was not seen, the resistance of EPDM to phenol must be questioned because the response is so slow. Only the low concentration samples stabilized within two years. Figure 51 shows the response of EPDM to an 8 percent solution of phenol in water at 50°C. Although the values for mechanical properties have not significantly declined, the weight of the sample is still increasing after

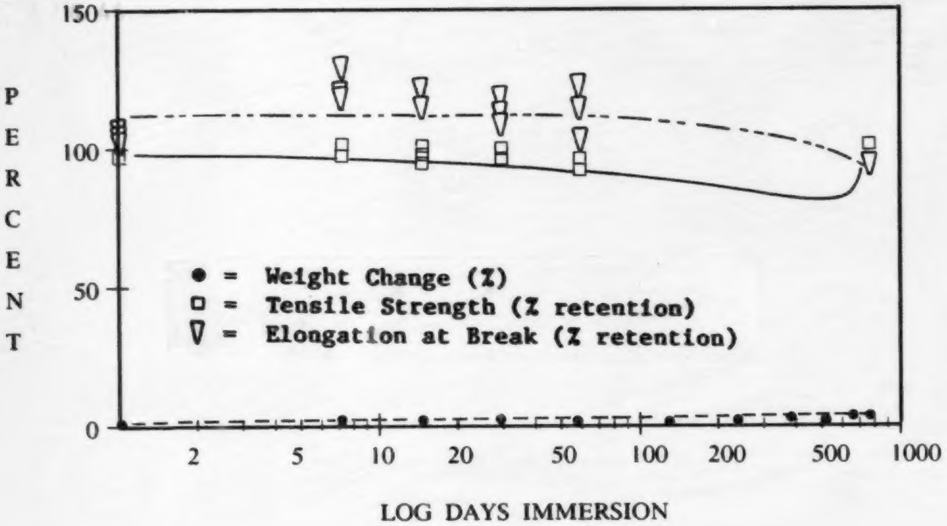


Figure 45. Physical property change with immersion in 1 percent furfural solution at 23°C for EPDM

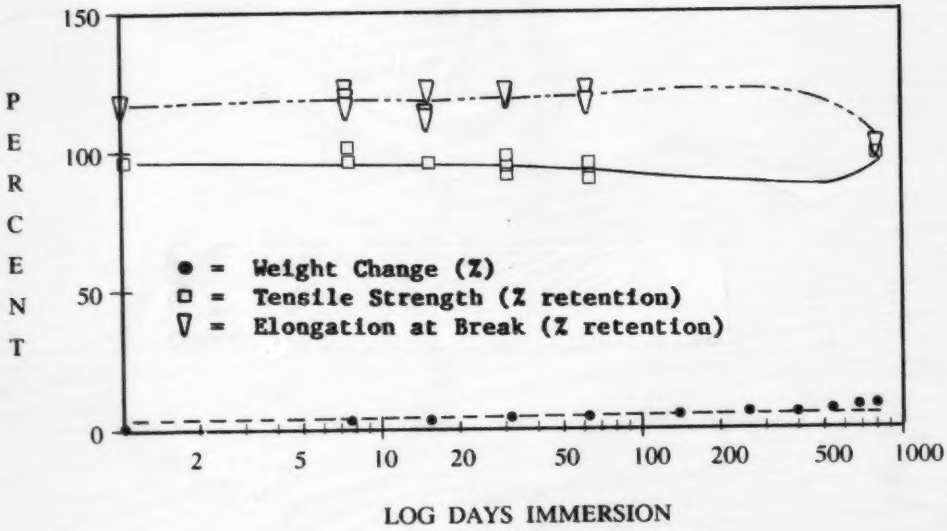


Figure 46. Physical property change with immersion in 4 percent furfural solution at 23°C for EPDM

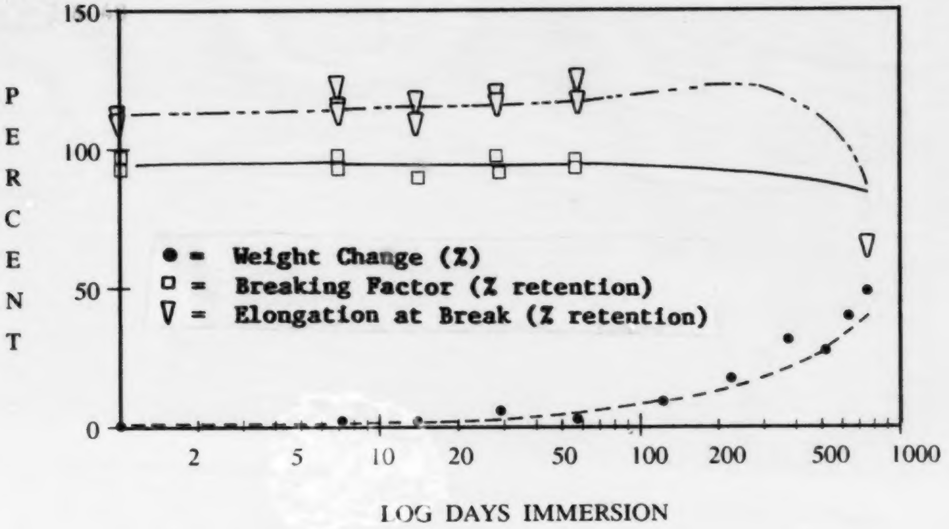


Figure 47. Physical property change with immersion in 8 percent furfural solution at 23°C for EPDM

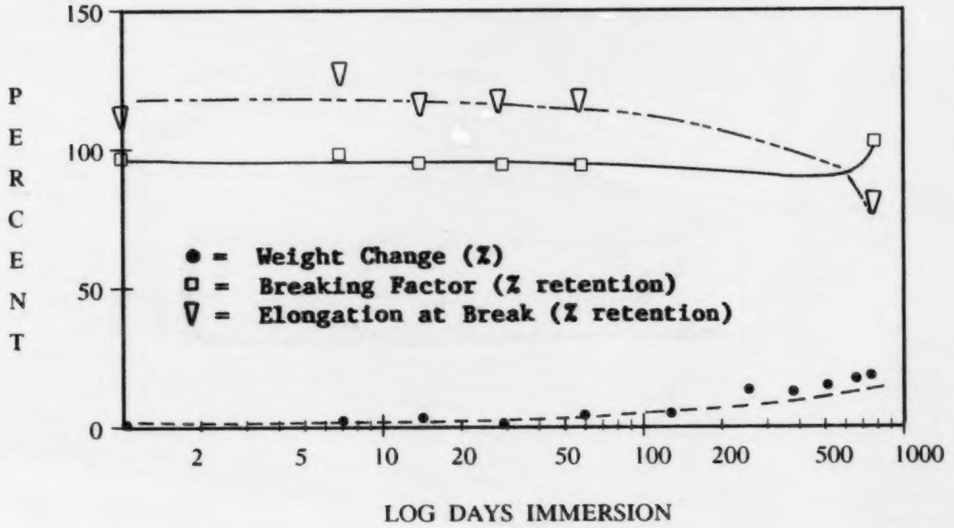


Figure 48. Physical property change with immersion in 1 percent furfural solution at 50°C for EPDM

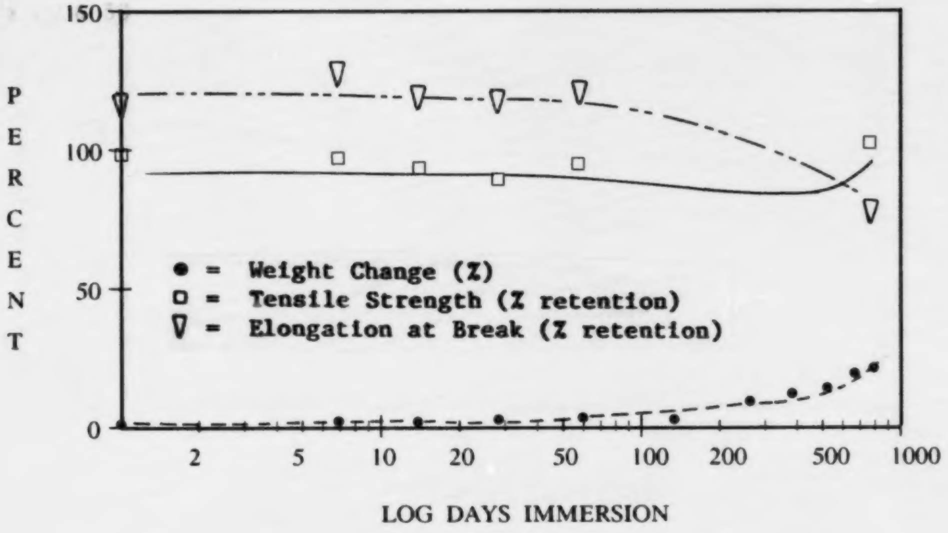


Figure 49. Physical property change with immersion in 4 percent furfural solution at 50°C for EPDM

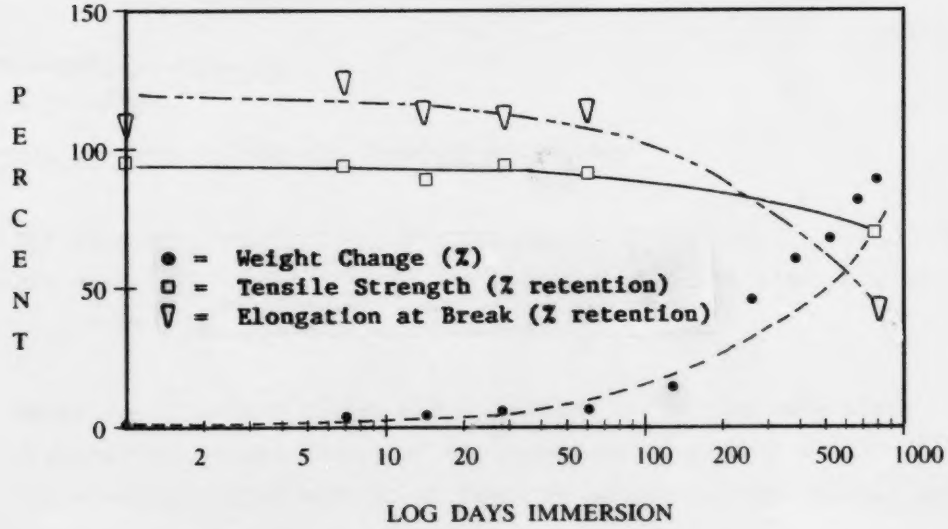


Figure 50. Physical property change with immersion in 8 percent furfural solution at 50°C for EPDM

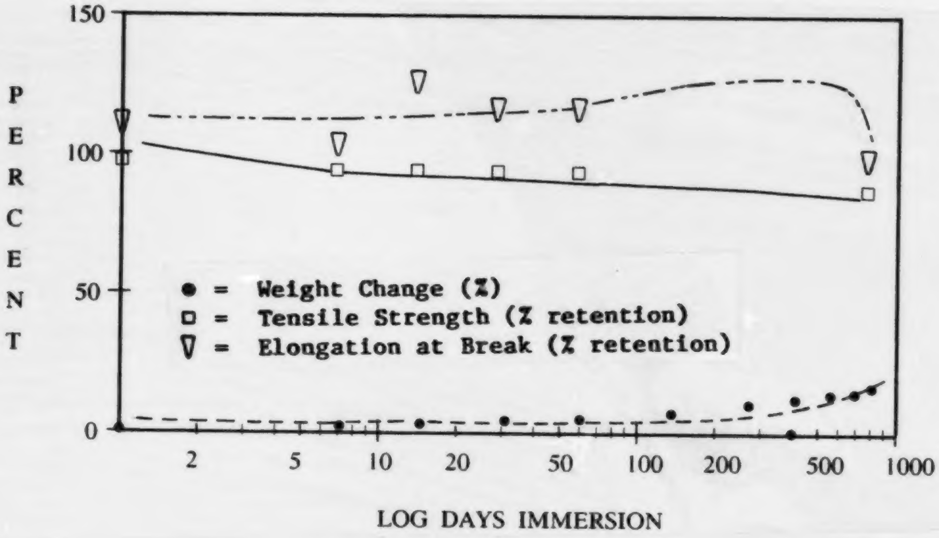


Figure 51. Physical property change with immersion in 8 percent phenol solution at 50°C for EPDM

two years. It is probable that further increase in weight would correspond to deterioration of the strength and elongation. This is an illustration of the importance of weight stability in evaluating chemical resistance.

EPICHLOROHYDRIN (EPI-CO)

Criteria for Determining FML Chemical Resistance

For this FML, based on the overall data in this project, the following criteria are proposed for determining EPI-CO chemical resistance with immersion tests:

- Stability of weight change and mechanical properties with time.
- A stabilized weight change of not more than 20 percent gain.
- The breaking factor must be at least 80 percent of the initial value and equal to or greater than the minimum as-received value in the material properties table of NSF Standard 54.
- The percent elongation at break must be at least 70 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.

Table 29. EPICHLOROHYDRON (EPI-CO): RESPONSE SUMMARY FOR CHEMICAL RESISTANCE

CHEMICAL NAME	CHEMICAL TYPE	TEMPER- ATURE EFFECT	CONCEN- TRATION EFFECT	TYPE OF RESPONSE	CONDITIONS		STABILITY ACHIEVED-	RESISTANT-	REASONS FOR NON-RESISTANCE *
Water	-	yes	-	Minor with Loss of	23 C	10% &	Y	Y	S(m)
				Elongation at 50 C	50 C	sat'd	Y	Y	EL(m)
Sodium Chloride	SALT	yes	yes	Minor with Loss of	23 C	10% &	Y	Y	
				Elongation at 50 C	50 C	sat'd	Y	N(10%)	EL(10%)
Potassium Dichromate	OXIDIZER	yes	-	Minor with Loss of	23 C	10% &	Y	Y	
				Elongation at 50 C	50 C	sat'd	Y	Y	EL(m)
Sodium Hydroxide	BASE	yes	-	Minor with Loss of	23 C	10%	Y	Y	
				Elongation at 50 C	50 C		Y	N	EL, TL(m)
ASTM #2 Oil	OIL	yes	-	Minor with Loss of	23 C	100%	Y	Y	
				Elongation at 50 C	50 C		Y	Y	
1,2-Dichloroethane	CHLORINATED HYDROCARBON	yes	yes	Moderate with Loss of	23 C	.1%	Y	Y	S(m)
				Elongation		.5%	Y	Y	
				at 50 C		.8%	Y	N	WG
					50 C	.1%	Y	N	WG, EL
						.5%	Y	N	WG, EL
						.8%	Y	N	WG, EL
Hydrochloric Acid	ACID	yes	-	Swell at 50 C with	23 C	10%	Y	Y	
				Loss of Elongation	50 C		N	N	S, WG, EL
Furfural	ALDEHYDE	yes	yes	Softening and	23 C	1%	N(m)	Y	S(m)
				Swelling with		4%	N	N	S, WG, BL, EL, TL
				Loss of		8%	Y	N	WG, BL, EL, TL
				Elongation at 50 C	50 C	1%	N	N	S, WG, EL
						4%	Y	N	WG, BL, EL, TL
						8%	Y	N	WG, BL, EL, TL
Methyl Ethyl Ketone	KETONE	yes	yes	Softening and	23 C	3%	Y	Y	
				Swelling with		13%	Y	N	WG, BL, TL(m)
				Loss of Elongation		26%	Y	N	WG, BL, EL, TL
				at 50 C	50 C	3%	Y	N	WG, EL
						13%	Y	N	WG, BL, EL(m), TL
						26%	Y	N	WG, BL, EL, TL
Phenol	PHENOL	yes	yes	Softening and	23 C	1%	N(m)	Y(m)	S(m), WG(m)
				Swelling with		4%	Y	N	WG, BL, EL, TL
				Loss of Elongation		8%	Y	N	WG, BL, EL, TL
				at 50 C	50 C	1%	Y	N	WG, EL
						4%	Y	N	WG, BL, EL, TL
						8%	N	N	S, WG, BL, EL, TL

* S = No Stability, WG = weight gain, BL = Breaking Factor Loss, EL = Elongation at Break Loss, TL = Tear Resistance Loss
- Y = Yes, N = No, (m) = marginal or borderline results

These criteria are used in evaluating the FML's response to the chemicals in Table 29. Table 29 is a summary of the results of chemical resistance testing for EPI-CO liner. The table is explained and amplified in the sections that follow. The chemicals listed in Table 29 are grouped according to the type of response seen. Resistance or non-resistance is listed in the second to last columns, and the reasons for a non-resistance rating are given in the last column. Also listed in the table are whether temperature and concentration effects were seen, whether the liner achieved stability in contact with the chemical exposure, and whether EPI-CO is considered resistant to the chemical exposure.

The recommended criteria for breaking factor, S-100 modulus and elongation agree with those used by the EPA in the document "Resistance of Flexible Membrane Liners to Chemicals and Wastes" (27). Tear resistance was not included in the EPA list. This EPA document lists ten percent as the limit for weight gain. A 20 percent limit was set in this project based on the relationship of weight gain to loss of mechanical property, and is larger than the EPA document limit. The LA rubber guide (23) defines categories of compatibility for elastomers as follows:

minor effect: 0 to 5 percent volume change
moderate effect: 5 to 10 percent volume change
severe effect: 10 to 20 percent volume change
not recommended: >20 percent volume change

For this EPI-CO liner, the ratio of weight change to volume change was 0.75. A 20 percent limit on weight gain would therefore mean approximately a 25-30 percent volume gain. This would be considered 'not recommended' by the rubber guide.

EPI-CO resistance ratings are listed in the EPA matrix (27) for only five chemical/temperature combinations tested in this project. Four of these five ratings given agree with ratings derived using the proposed criteria with project data (water and HCl at low and high temperature). EPI-CO was rated as non-resistant only to HCl at high temperature (tested at 100 C) in the matrix, based on qualitative information. Disagreement between the EPA matrix and project data was for liner exposed to NaOH at 50°C, which was rated as non-resistant in this project because of loss of elongation with time. The matrix rating was based on a manufacturer's qualitative report, and the length of exposure was not given.

Agreement between percentage change criteria and absolute minimum property values (using Standard 54 tables) was good for elongation at break and tear resistance, although the percentage change criteria were more stringent. Agreement between percentage change and absolute criteria for breaking factor was not good, because the EPI-CO liner initial (unexposed) results were within 10 percent of the Standard 54 table values. In determining chemical resistance for Table 29, therefore, the absolute criteria for breaking factor is not used. This is done to focus the interpretation on the material response rather than the strength limitations of this particular EPI-CO liner sample.

A major limitation inherent in these proposed criteria for EPI-CO chemical resistance is the effect of temperature on chemical resistance. As discussed below, the long-term effect of a 50°C exposure is significant for EPI-CO. No service temperature limits can be proposed since only two temperatures were used for immersion testing, but long-term service at 50°C does not appear to be suitable for EPI-CO.

Response Time and Stability

An FML response to the chemical immersion must stabilize in order for it to be considered chemically resistant. Response time, or the time required for the liner to stabilize in a given solution, varied from less than one week to more than twenty months for this EPI-CO FML.

Significant weight changes (large enough to correspond with changes in breaking strength) were usually evident within a two-month test period, although weight often continued to increase. Breaking strength and tear resistance stabilized faster than weight change, usually within two months. Changes observed in elongation at break were both rapid and slow. Rapid changes were associated with absorption of organic chemical solutions, while slow changes in elongation at break were evident for samples exposed for twenty-months at 50°C to water and inorganics.

Magnitude of Liner Response

A two-part evaluation of the magnitude of physical property change was followed in determining EPI-CO chemical resistance. Both an absolute minimum value for a mechanical property (for example, elongation at break) and an allowable percent change of that property (from the initial value) were determined.

The range of changes seen in the EPI-CO liner was large. No losses in weight were seen, but weight gain varied overall from less than one percent to over 100 percent, depending on the exposure conditions. Exposure to water at 23°C and 50°C caused EPI-CO weight gains of 13 and 19 percent within twenty months, respectively. Weight gains seen in salt, potassium dichromate, sodium hydroxide, and ASTM #2 oil were less than those in water at each temperature. Solutions of organic chemicals (MEK, DCE, furfural, and phenol) in all cases caused weight gains larger than in water, and increased with increasing concentration and temperature.

Changes in the mechanical properties of the EPI-CO liner in general corresponded to weight changes. Minimum retention of breaking strength was 33 percent (eight percent phenol at 50°C, Figure 51), 22 percent of elongation (eight percent furfural at 50°C, Figure 51), and of tear resistance 23 percent (eight percent phenol at 23°C).

Absolute Amount--

Using the Standard 54 table values for elongation at break and tear resistance, three of the organic solutions (MEK, furfural, and phenol) were rated non-resistant at the highest concentration. Results for all other exposures were above the table values.

The breaking factor absolute value, 90 lb/inch width, was not used in determining non-resistance for EPI-CO because the unexposed liner breaking factor values were very close to or below the absolute limit, probably caused by testing variability. In actual waste testing, with a prospective FML, the liner should be evaluated using this absolute limit.

Percent Change from Initial Value--

The percent changes in material properties suggested as criteria for chemical resistance were developed by evaluating the variability in the material and testing process, and setting reasonable estimates of material degradation.

Figure 52 shows the relationship between breaking factor and weight change for machine direction samples. Breaking factor variability in this EPI-CO liner was approximately ± 15 percent, measured by looking at those samples with little or no weight change. (Variability in the transverse direction was similar.) A limit on change of 20 percent was chosen as a conservative estimate of real material degradation. (e.g., changes of greater than 20 percent may result from immersion in compatible chemicals, but this limit provides a safety factor until additional data can support a higher limit.)

Retention of ultimate elongation (machine direction) is shown as a function of weight change in Figure 53. Variability in elongation is about ± 25 percent. Decreases in elongation with time were from two causes: absorption of organic chemical solutions, which was relatively fast, and exposure at 50°C, apparent only after a twenty month immersion period. A 30 percent decrease in elongation was chosen as evidence of degradation.

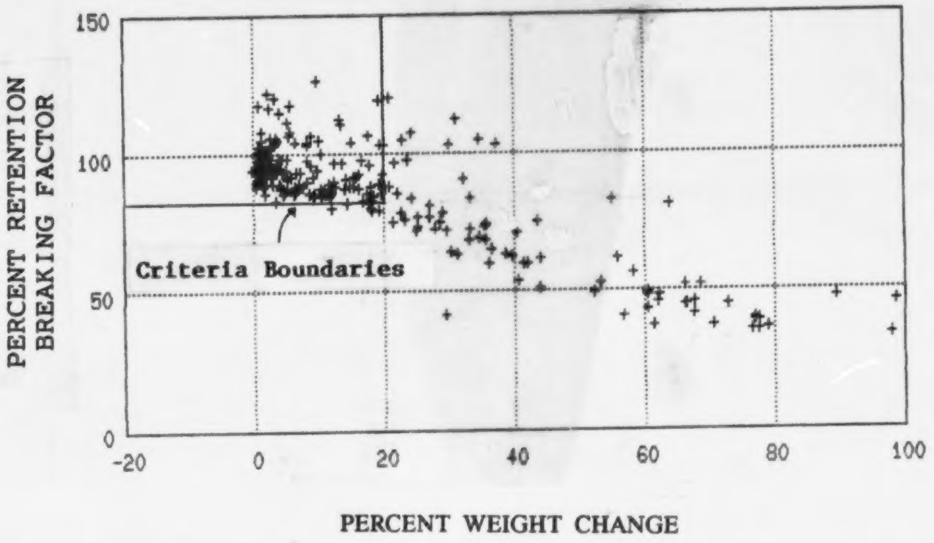


Figure 52. Relationship between breaking factor and weight change for EPI-CO

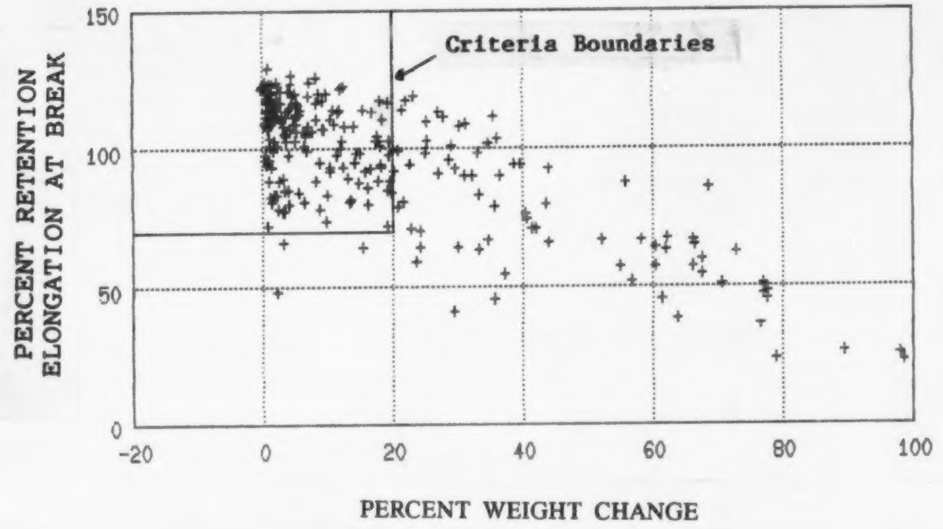


Figure 53. Relationship between elongation at break and weight change for EPI-CO

Tear resistance had a variability of about 25 percent. Figure 54 shows the relationship between weight change and retention of tear resistance. Although a trend of decreasing tear resistance with increasing weight is clear, the locus of points around zero weight change is centered at 90 percent retention.

A limit for allowable stabilized weight gain for this CPE liner was set at 20 percent, based on the relationship between changes in breaking factor and changes in weight, and on the relationship between tear resistance and weight change.

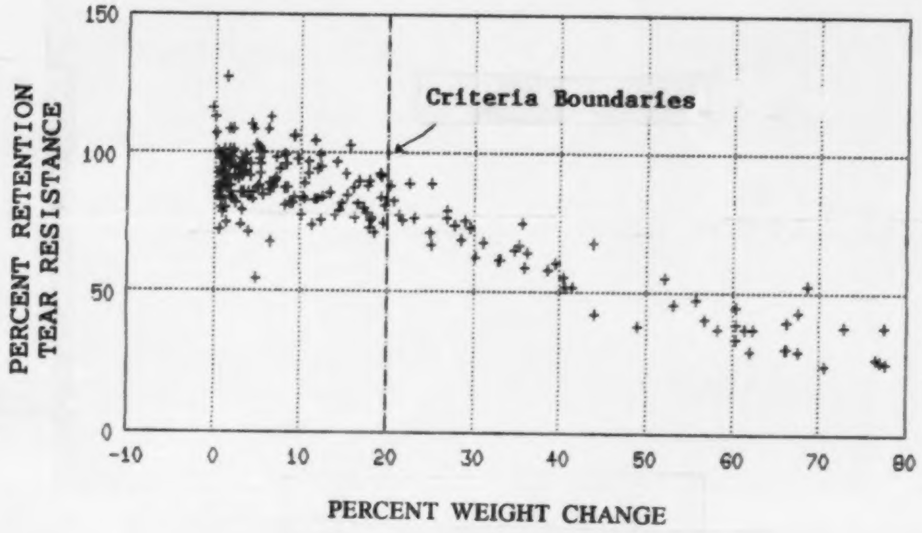


Figure 54. Relationship between tear resistance and weight change for EPI-CO

Types of Effects

The results in Table 29 for EPI-CO, a polar elastomeric liner, are grouped according to the type of effects seen. Temperature and concentration effects are noted in the third and fourth columns. Three basic types of response to chemical immersion were observed with this liner: minor change, degradation due to temperature sometimes with indications of stiffening, and swelling and softening (sometimes accompanied by degradation due to temperature).

Temperature Effects--

The response of EPI-CO to increased immersion temperature shows that an elevated temperature may be suitable for accelerating the material response in short-term testing (perhaps up to four months). But for extended test duration, significant effects are seen due to temperature alone at 50°C. A decrease in the elongation at break after a two-year immersion period was observed in all exposures.

This long-term loss of elongation at 50°C was accompanied by an increase in the breaking factor for water, salt, dichromate, and ASTM #2 oil exposures. This indicates that the liner is becoming less flexible with time.

Concentration Effects--

Four organic chemicals were tested in three concentrations. All responses seen with these chemicals were affected by concentration. Percent weight gain increased with increasing concentration. Breaking strength and tear resistance decreased with increasing solution concentration. Elongation decreased with increasing concentration for phenol, MEK, and furfural exposures.

Indicators of Non-Resistance

For this EPI-CO liner, the most important indicators of non-resistance were weight change, breaking strength, and elongation at break. Tear resistance generally followed the same trend as breaking strength, and volume change (swelling) corresponded to weight change. Since tear resistance testing was performed only for exposure up to two months in duration, no long-term trends in tear resistance are known.

In general, an increase in sample weight indicated a change in mechanical properties for EPI-CO. When weight gain was due primarily to absorption of organic chemicals, strength and elongation responded quickly and were less than initial values. When weight gain was due primarily to absorption of water at 50°C, elongation at break showed long-term deterioration.

Minor Change--

The following 23°C exposures produced only minor changes in weight and mechanical properties: water, sodium hydroxide, hydrochloric acid, salt, potassium dichromate, ASTM #2 oil, water with ASTM #2 oil added, one percent phenol, one percent MEK, 0.1 and 0.5 percent DCE, and one percent furfural. An example is shown in Figure 55. This figure shows the response of the EPI-CO liner to a saturated salt solution at 23°C. Weight gain is less than three percent over the two-year period. Breaking strength was not affected, nor was the elongation at break.

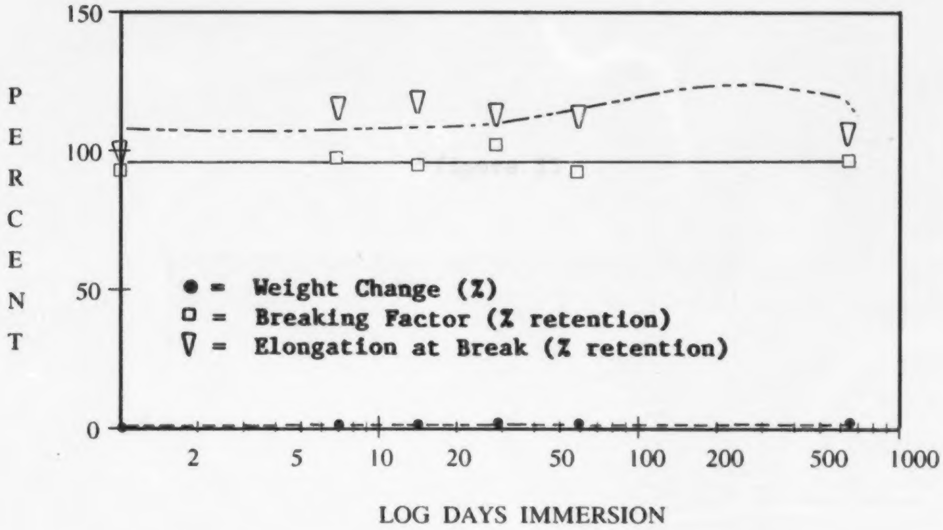


Figure 55. Physical property change with immersion in saturated (35 percent) salt solution at 23°C for EPI-CO

Degradation Due to Temperature--

As previously discussed, degradation in material properties was caused by exposure to 50°C solutions. While weight gain and elongation at break are the best indicators for this effect, breaking strength was also affected sometimes. Figures 56 and 57 compare the response of the EPI-CO liner to water at 23 and 50°C. In Figure 56, a moderate gain in weight (absorption of water) is

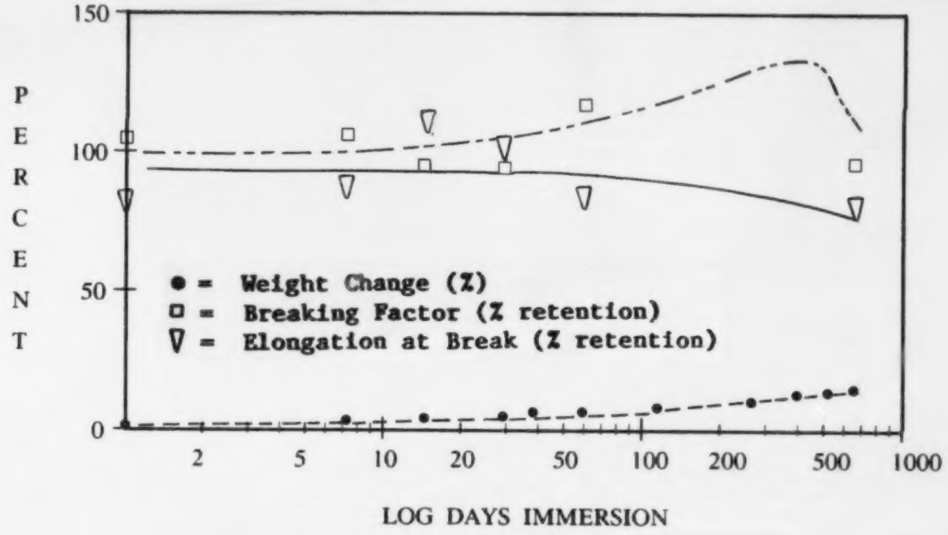


Figure 56. Physical property change with immersion in water at 23°C for EPI-CO

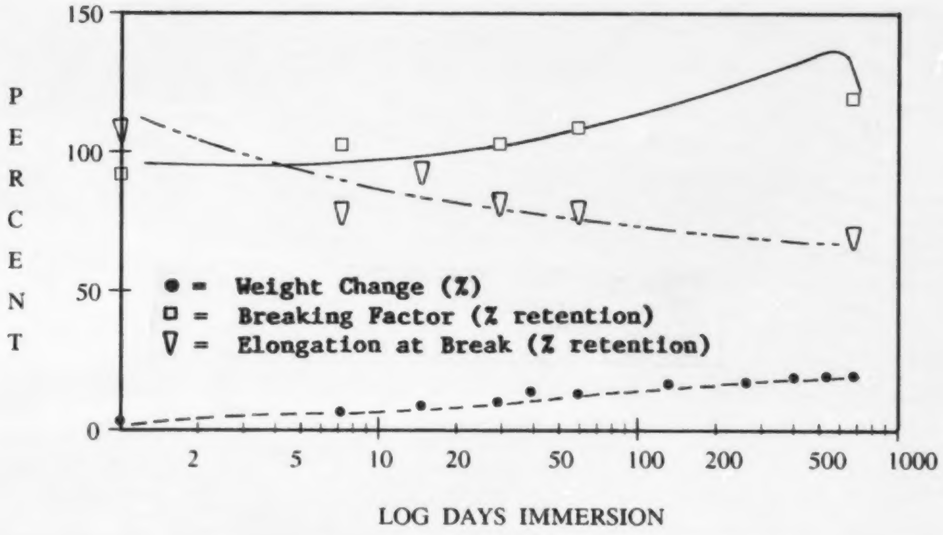


Figure 57. Physical Property change with immersion in water at 50°C for EPI-CO

seen. It is not clear whether weight stability has been achieved at the end of the twenty month testing period. Breaking factor and elongation, although variable for this sample, show no conclusive changes or trends.

In Figure 57 (50°C), however, changes are evident in the EPI-CO liner. Weight gain is only slightly more than the gain at 23°C, and has stabilized. Breaking strength shows an upward trend, and elongation a downward trend with time. This suggests that the liner is becoming stiffer with exposure to the hot water.

Exposure to HCl at 50°C also produced effects not seen in the 23°C exposure. At 23°C no conclusive changes were observed, and weight gain was smaller than in water alone. At 50°C, (Figure 58) however, weight gain is greater than water and has not stabilized at the end of the test period. Both breaking strength and elongation decreased. The liner is not becoming stiffer, as it is in water alone, but is becoming softer and weaker with time.

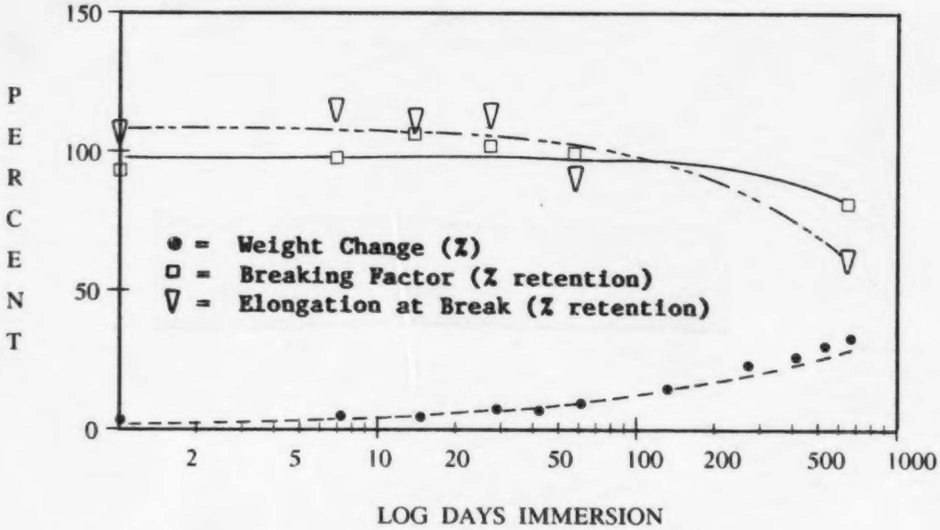


Figure 58. Physical property change with immersion in 10 percent hydrochloric acid solution at 50°C for EPI-CO

Swelling and Softening--

The EPI-CO response to organic solutions (phenol, furfural, MEK, and 1,2-dichloroethane) was primarily one of swelling and softening. The degree of the response was dependent on the chemical concentration in all cases. Typical responses were weight gain (and swelling), loss of breaking strength, and loss of elongation. Blisters were seen on some samples exposed to MEK and furfural. Additional deterioration in elongation was a result of exposure at 50°C.

These effects are illustrated in Figures 59-64. These figures show the response of EPI-CO liner to solutions of phenol in water. Weight change, retention of breaking factor, and retention of elongation at break are shown as a function of immersion time. Figures 59-61 show results for 23°C exposures, and 62-64 for 50°C exposures. Weight gains increase with concentration and with temperature. Variability in weight measurements is high at the highest concentration (8 percent). Weight stability is not achieved for the lowest concentration at low temperature, nor for the highest concentration at the high temperature (Figures 59 and 64).

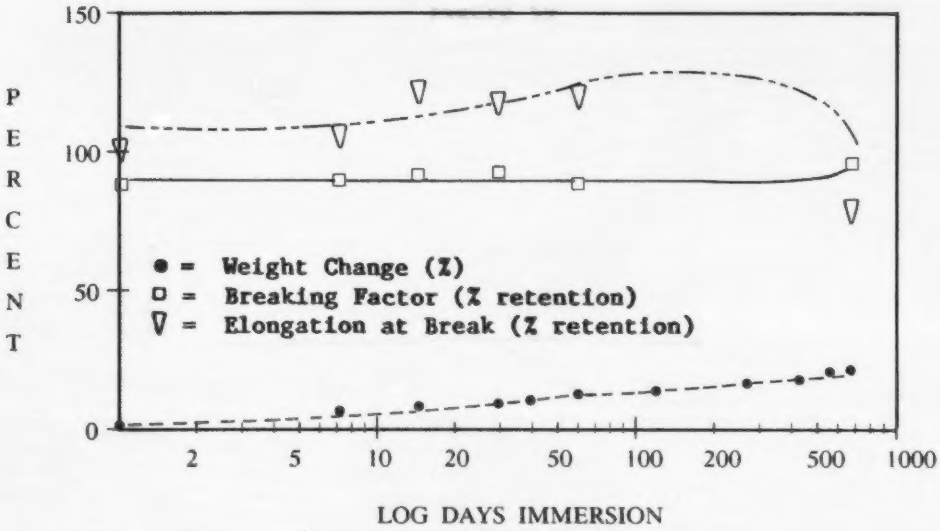


Figure 59. Physical property change with immersion in 1 percent phenol solution at 23°C for EPI-CO

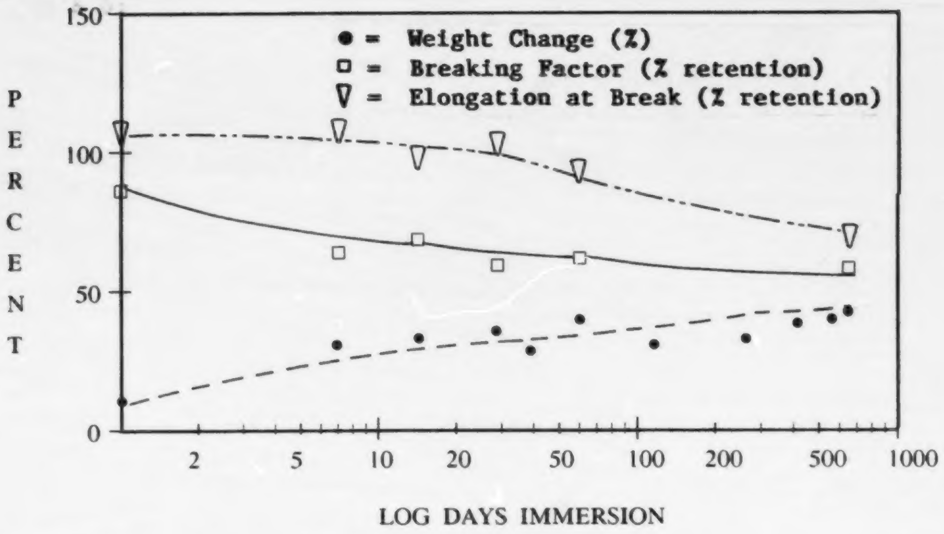


Figure 60. Physical property change with immersion in 4 percent phenol solution at 23°C for EPI-CO

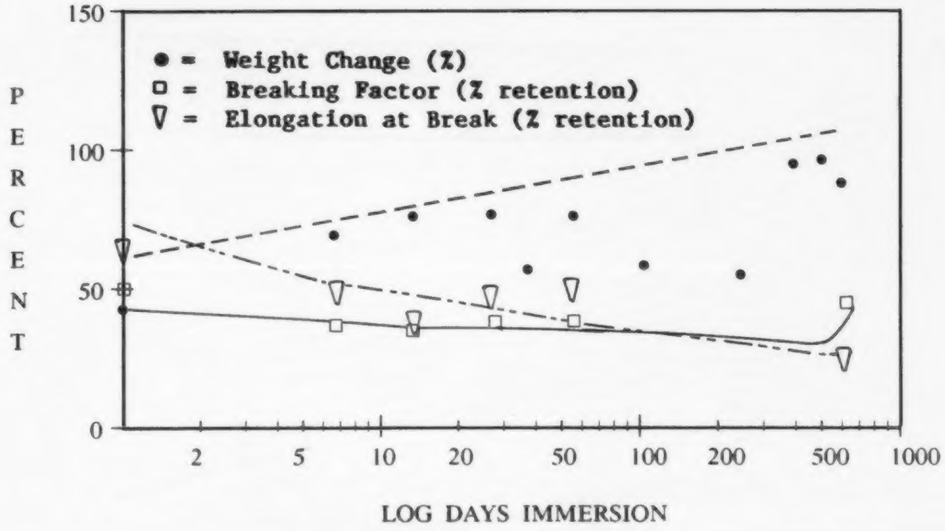


Figure 61. Physical property change with immersion in 8 percent phenol solution at 23°C for EPI-CO

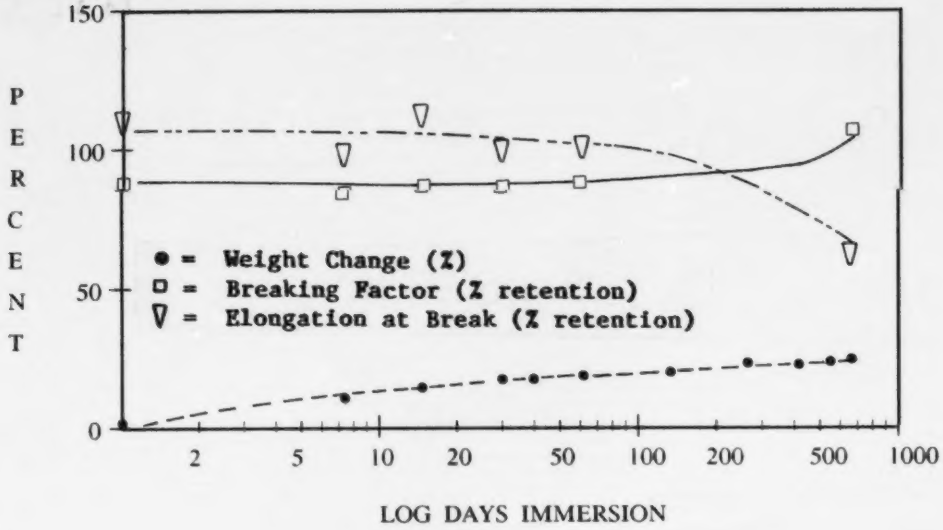


Figure 62. Physical property change with immersion in 1 percent phenol solution at 50°C for EPI-CO

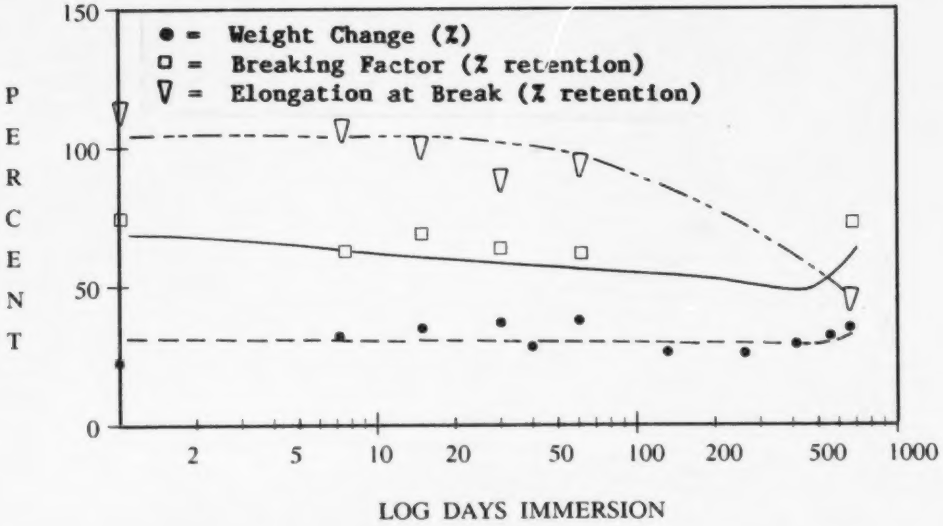


Figure 63. Physical property change with immersion in 4 percent phenol solution at 50°C for EPI-CO

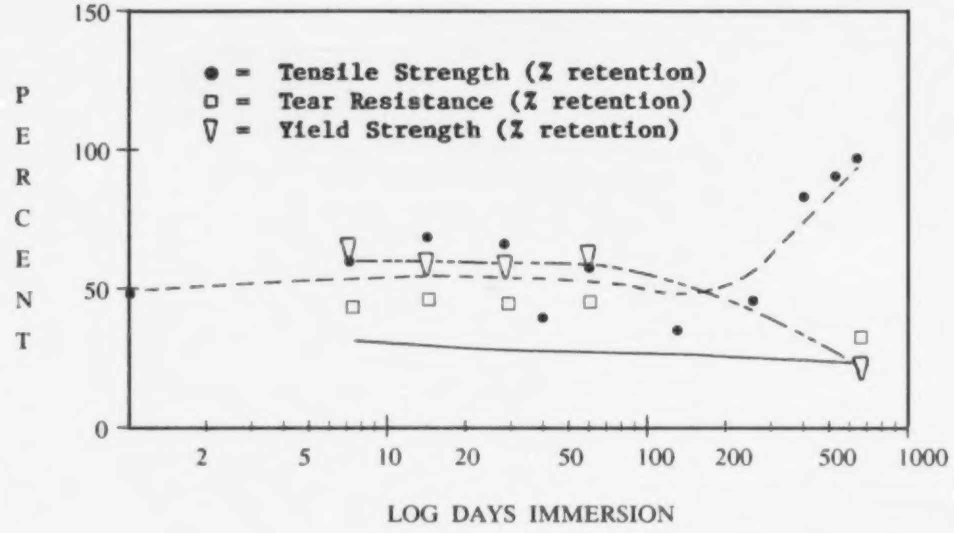


Figure 64. Physical property change with immersion in 8 percent phenol solution at 50°C for EPI-CO

The loss in breaking strength is clearly dependent on solution concentration, although the strength stabilizes quickly (generally in one week). There is no significant difference in retention of breaking strength between the two exposure temperatures. The exception to these two statements is the response to a 1 percent phenol solution at 50°C. Here the response is similar to the response in water at 50°C (Figure 57), with strength increasing with time. This suggests that the effect of water and heat is predominant over the effect of phenol.

HIGH DENSITY POLYETHYLENE (HDPE)

Criteria for Determining FML Chemical Resistance

For this FML, based on the overall data in this project, the following criteria are proposed for determining HDPE chemical resistance with immersion tests.

- Stability of weight change and mechanical properties with time.
- A stabilized weight gain of not more than 3 percent.
- The breaking factor must be at least 80 percent of the initial value and equal to or greater than the minimum as-received value in the material properties table of NSF Standard 54.
- The percent elongation at break must be at least 80 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.
- The yield strength must be at least 80 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.
- The elongation at yield must change no more than 20 percent in either direction and be equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.
- Tear resistance must be at least 80 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.
- Modulus of elasticity must be at least 70 percent of the initial value and equal to or greater than the minimum as-received value in the material property table of NSF Standard 54.

These criteria are used in evaluating the FML's response to the chemicals in Table 30. Table 30 is a summary of the results of chemical resistance testing for HDPE liner, and the table is explained and amplified in the sections that follow. The chemicals listed in Table 30 are grouped according to the type of response seen. Resistance or non-resistance is listed in the

Table 30. HIGH DENSITY POLYETHYLENE (HDPE): RESPONSE SUMMARY FOR CHEMICAL RESISTANCE

CHEMICAL NAME	CHEMICAL TYPE	TEMPER-ATURE EFFECT	CONCEN-TRATION EFFECT	TYPE OF RESPONSE	CONDITIONS		STABILITY ACHIEVED-	RESISTANT-	REASONS FOR NON-RESISTANCE *
Water	-	no	-	minor	23 C	-	Y	Y	
					50 C		Y	Y	
Sodium Chloride	SALT	no	no	minor	23 C	10% &	Y	Y	
					50 C	sat'd	Y	Y	
Potassium Dichromate	OXIDIZER	yes	-		23 C	10%	Y	(m)	BL(m), ML(m)
					50 C		Y	Y	
Hydrochloric Acid	ACID	no	-	minor	23 C	10%	Y	Y	
					50 C		Y	Y	
Furfural	ALDEHYDE	yes	yes	weight gain with	23 C	1%	Y	(m)	BL(m), EL(m)
				decrease in		4%	Y(v)	(m)	BL(m), EL(m)
				strength and		8%	Y(v)	(m)	WG(m), BL(m), EL(m)
				elongation	50 C	1%	Y	(m)	BL(m), EL(m)
						4%	Y(v)	(m)	WG(m), BL(m), EL(m)
						8%	Y(v)	(m)	WG(m), BL(m), EL(m)
1,2-Dichloroethane	CHLORINATED HYDROCARBON	yes	yes	weight gain with	23 C	.1%	Y	(m)	BL(m), EL(m)
				decrease in		.5%	Y(v)	(m)	WG(m), BL(m), EL(m)
				strength and		.8%	Y	N	WG, BL(m), EL(m)
				elongation	50 C	.1%	Y	(m)	BL(m), EL(m)
						.5%	Y(v)	(m)	WG(m), BL(m), EL(m)
						.8%	Y	N	WG, BL(m), EL(m)
Sodium Hydroxide	BASE	no	-	minor	23 C	10%	Y	Y	
					50 C		Y	Y	
ASTM #2 Oil	OIL	yes	yes	weight gain,	23 C	100%	N	N	S, WG, EVG
				softening	50 C		Y	N	WG, EVG, ML, TL(m)
Methyl Ethyl Ketone	KETONE	yes	yes	weight gain with	23 C	3%	Y(v)	Y	
				decrease in		13%	Y(v)	Y	
				strength and		26%	Y	(m)	WG(m)
				elongation	50 C	3%	Y(v)	(m)	EVG(m)
						13%	Y(v)	(m)	WG(m), EVG(m), ML(m)
						26%	Y(v)	(m)	WG(m), ML(m)
Phenol	PHENOL	no	yes	weight gain with	23 C	1%	Y	(m)	BL(m), EL(m)
				decrease in		4%	Y	(m)	BL(m), EL(m)
				strength and		8%	Y	(m)	BL(m), EL(m)
				elongation	50 C	1%	Y	(m)	EVG(m), BL(m), EL(m)
						4%	Y	N	WG(m), EVG, BL(m), EL(m)
						8%	Y	(m)	BL(m), EL(m)

* S = No Stability, WG = weight gain, BL = Breaking Factor Loss, EL = Elongation at Break Loss, TL = Tear Resistance Loss EVG = Elongation at Yield Gain, ML = Modulus Loss, (m) = marginal or borderline results

- Y = Yes, N = No, (v) = variable results due to volatility of chemical second to last columns, and the reasons for a non-resistance rating are given in the last column. Also listed in the table are whether temperature and concentration effects were seen, whether the liner achieved stability in contact with the chemical, and whether the HDPE is considered resistant to the chemical exposure.

These suggested criteria for weight change, breaking factor (calculated as tensile strength), and elongation at yield are the same as those proposed by the EPA in the document "Resistance of FMLs to Chemicals and Wastes" (27). Tear resistance, yield strength, elongation at break, and modulus of elasticity were not included in the EPA list.

The Modern Plastics Encyclopedia (16) considers a less than ten percent change in tensile strength of HDPE as 'usually not significant', a change of 10 to 20 percent 'significant but usually not conclusive', and more than 20 percent change 'usually significant'. To compare NSF results with this guidance, Table 30 shows changes between 10 and 20 percent as marginal (m) for breaking strength, yield strength, tear, modulus, and elongation at yeild and break. Weight gains between 2 and 3 percent are also listed as marginal (m).

HDPE resistance ratings are listed in the EPA matrix for nine of the chemicals tested in this project. Five of the favorable ratings given in the matrix agree with resistant ratings derived using the proposed criteria with project data (NaOH, HCl, dichromate, salt, and water). Two chemicals were rated as unfavorable in the matrix: phenol and 1,2-dichloroethane. NSF results for some concentrations of these two chemicals also showed non-resistance. Furfural and MEK were listed as resistant in the matrix, but NSF results were not conclusive. For both furfural and MEK, changes in properties in the 10 to 20 percent range were observed.

Response Time and Stability

The HDPE FML response to the chemical immersion must stabilize in order for it to be considered chemically resistant. Response time, or the time required for the liner to stabilize in a given solution, varied from less than one week to two years for HDPE. Only one exposure, ASTM #2 oil at 23°C did not stabilize with respect to weight.

Magnitude of Liner Response

A two-part evaluation of the magnitude of physical property change was followed in determining HDPE chemical resistance. Both an absolute minimum value for a mechanical property (for example, yield strength) and an allowable percent change of that property (from the initial value) were detemined. Note: the absolute minimum requirement was not used for elongation at break and modulus (see following section).

The range of changes seen in the HDPE liner was small. No losses in weight were seen, and weight gain varied overall from less than one percent to over six percent, depending on the exposure conditions. The largest weight gains were in ASTM #2 oil and saturated 1,2-dichloroethane.

Changes were generally between zero and 20 percent for all mechanical properties except elongation at yield and modulus of elasticity. Elongation at yield tended to increase with weight gain, and some values above 140 percent were measured. Modulus decreased with weight gain in oil exposures only to roughly 50 percent of its inital value.

Absolute Amount—

Standard 54 values were not critical in determining chemical resistance for the project data for two reasons. First, none of the results of strength properties (tear resistance, yield, and breaking strength) or elongation at yield were lower than the Standard 54 table values. In addition, only a few elongation at break and modulus of elasticity results were lower than the Standard 54 values. These were not used as resistance criteria in Table 30 because the method used for elongation measurement (grip separation) gives results less than when an extensometer is used.

In evaluating future test data, however, the table values do provide a benchmark for comparison. It appears that the strength properties in the Standard 54 table may be too low, based on the difference between project data and table values for breaking factor, yield strength, and tear resistance.

Percent Change from Initial Value--

The percent changes in property listed as recommended criteria were developed by evaluating the variability in the material and testing process, and setting reasonable estimates of material degradation.

Figure 65 shows the relationship between tensile strength (psi -- breaking factor divided by thickness) and weight change (divided by thickness to indicate percent change per inch thickness) for machine direction samples. A weight change adjusted for thickness of 50 percent per inch thickness corresponds approximately to a 1.5 percent weight change. This presentation was chosen to minimize scatter in the data due to thickness variation. Reproducibility of the measurement of HDPE tensile strength was approximately ± 15 percent, measured by looking at those samples with zero weight change. A limit on change of 20 percent was chosen as an estimate of real material degradation. Changes between 10 and 20 percent were listed as borderline in the table.

Table 31 lists the test variability for each of the measured HDPE properties, the criteria that were chosen, and whether or not there is a relationship between weight gain and that measurement. The only changes in mechanical properties of the HDPE liner that corresponded to weight changes were modulus of elasticity and elongation at yield.

A limit for allowable stabilized weight gain for this HDPE liner was set at 3 percent for immersion tests. This limit is based on manufacturer's recommendations as listed in the EPA matrix (27). No weight criteria could be established from the project data, since there were not good correlations between weight and mechanical properties.

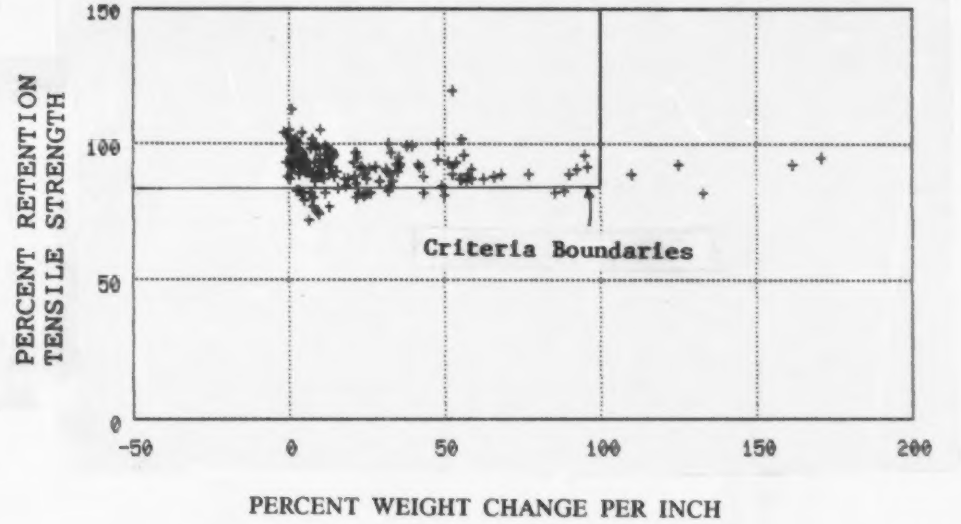


Figure 65. Relationship between tensile strength (normalized for thickness) and weight change for HDPE

TABLE 31. VARIABILITY IN HDPE TEST MEASUREMENTS

Test	Variability (percent)	Criteria for Resistance	Relationship to Weight Change
Tensile Strength at Break	15	<20	no
Elongation at Break	10	<20	no
Tensile Strength at Yield	10	<20	no
El. at Yield	10	<20	yes
Modulus	20	<30	yes
Tear	10	<20	no
Weight		< 3	-

Types of Effects

The results in Table 30 for this partially crystalline HDPE liner are grouped according to the type of effects seen. Temperature and concentration effects are noted in the third and fourth columns. Three basic types of response to chemical immersion were observed with this liner: minor change, swelling and softening (oil), and weight gain with decrease of strength and elongation.

Temperature Effects—

Temperature had a moderate effect on HDPE FML results. Weight gains were slightly larger in those samples exposed at 50°C than at 23°C. Elongation at yield was greater in 50°C samples for immersions of phenol and MEK.

In ASTM #2 oil, the modulus of elasticity and the tear resistance were less for samples exposed at 50°C.

Only the immersion sample exposed to ASTM #2 oil at 23°C did not stabilize with respect to weight. The 50°C sample did stabilize, so the increased temperature appears to have accelerated the response. Increasing the temperature of immersion tests for HDPE appears to be a satisfactory option for accelerating response.

Concentration Effects—

Four organic chemicals were tested in three concentrations. All responses seen with these chemicals were affected by concentration. Percent weight gain increased with increasing solution concentration.

Indicators of Non-Resistance

For this HDPE liner, the most important indicators of non-resistance were weight change, tensile strength, modulus, elongation at yield.

Weight change is generally smaller than other types of FMLs because of the crystalline nature of the HDPE. With smaller weight changes, the method reproducibility becomes more important, and extra care is needed in measuring.

Tensile strength appears to give indications of chemical resistance but no conclusive results were obtained, that is, no consistent changes more than 20 percent were seen. The variability in this measurement is about 15 percent, so it was difficult to definitely show changes.

Modulus of elasticity is a difficult measurement to take, and showed a variability of 20 percent. The elastic portion of the HDPE liner stress/strain curve is small, with yield occuring at about 10 to 20 percent elongation. Graphical methods were used to record much of the modulus data. Only for ASTM #2 oil was there a large decrease in modulus, so it is not possible to generalize the relationship of modulus change to weight change to all situations.

Elongation at yield increased with weight gain for some immersion samples. Only for a few exposures (mostly ASTM #2 oil) were the changes conclusive (greater than 20 percent).

It must be noted that environmental stress crack resistance (ESCR) was not considered in this project. ESCR is oftened considered an important parameter for HDPE and other partially crystalline materials. Susceptibility to stress cracking from exposure to the chemicals tested in the project would not be apparent from the results since the samples were not under stress during exposure.

Minor Change--

The following 23°C exposures produced only minor changes in weight and mechanical properties: water, sodium hydroxide, hydrochloric acid, salt, and potassium dichromate. An example is shown in Figure 66 and 67. These figures show the response of the HDPE liner to a 10 percent NaOH solution at 50°C. Weight gain (not shown) is less than one percent over the two-year period. Figure 66 shows tensile strength, yield strength, and tear resistance as a

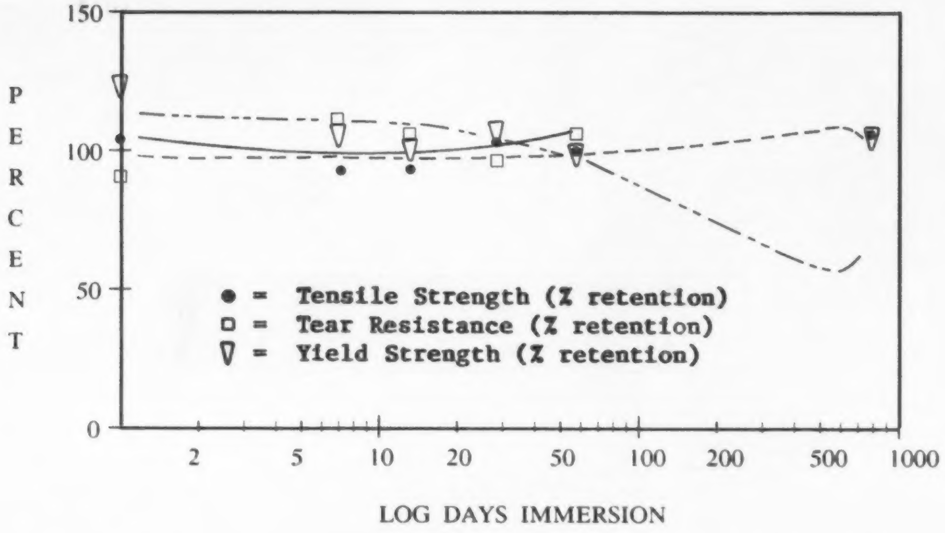


Figure 66. Percent tensile, yield and tear resistant change with immersion in 10 percent sodium hydroxide solution at 50°C for HDPE

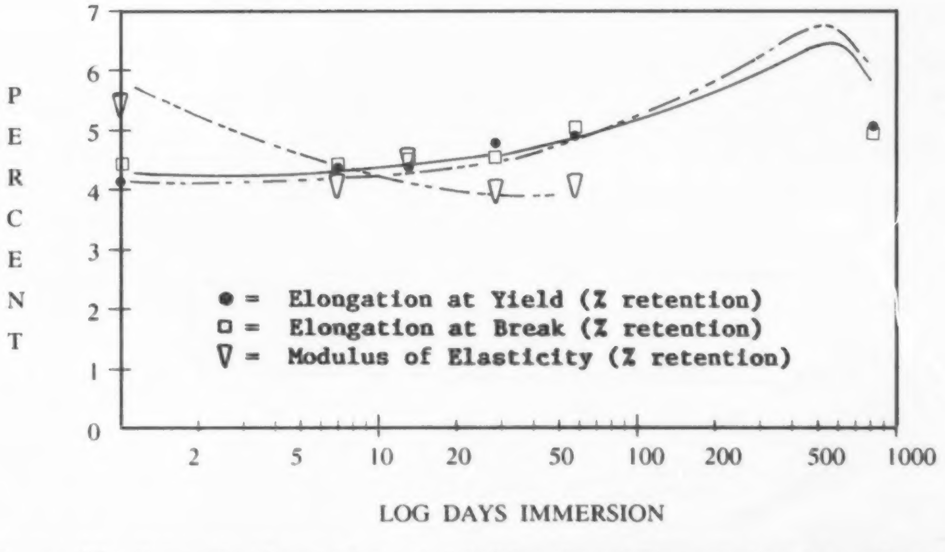


Figure 67. Percent elongation at yield, elongation at break, and modulus of elasticity change with immersion in 10 percent sodium hydroxide solution at 50°C for HDPE

function of immersion time. None show significant change over the immersion period. Figure 67 shows elongation at yield, elongation at break, and modulus of elasticity. No significant trends are seen.

Weight Gain with Softening--

The response to ASTM #2 oil at 50°C is illustrated in Figures 68,69 and 70. Weight gain was over six percent, and stabilized after about 150 days (Figure 67). No significant changes were seen in the strength properties: tensile strength, yield strength, and tear resistance (Figure 69). Figure 70, however, does illustrate changes in mechanical properties after immersion. Elongation at yield increased and the modulus of elasticity decreased with increasing immersion time. (Two year samples could not be tested for modulus due to the sample shape.) Elongation at break shows no change.

Weight Gain with Decrease in Strength and Elongation--

In the organic solutions, changes in physical properties generally fell in the the borderline region (2 to 3 percent for weight, 10 to 20 percent for mechanical). Weight, breaking strength and elongation were the main indicators. While for most immersion these changes were not conclusive due to the limits of significance of the testing, they indicate that there is question about the resistance of the HDPE to these chemicals.

Using the weight change criteria, HDPE was considered non-resistant to saturated 1,2-dichloroethane. Consistent weight changes above three percent were measured. Changes in mechanical properties were borderline (10 to 20 percent) and not conclusive.

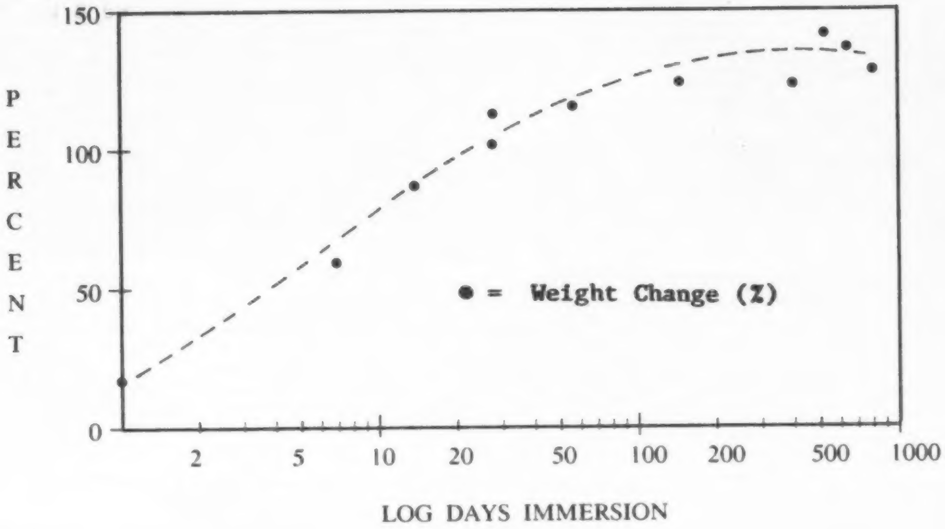


Figure 68. Percent weight change with immersion in ASTM #2 oil at 50°C for HDPE

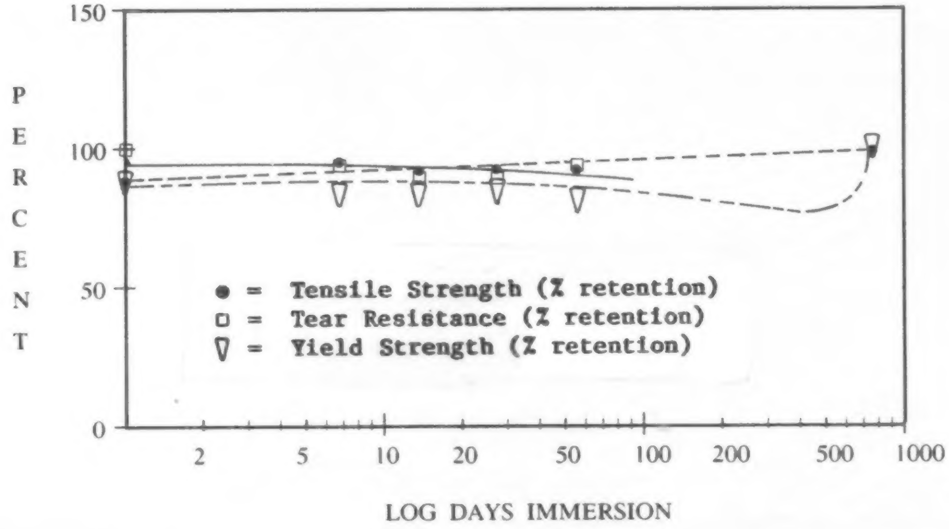


Figure 69. Percent tensile yield and tear resistance change with immersion in ASTM #2 oil at 50°C for HDPE

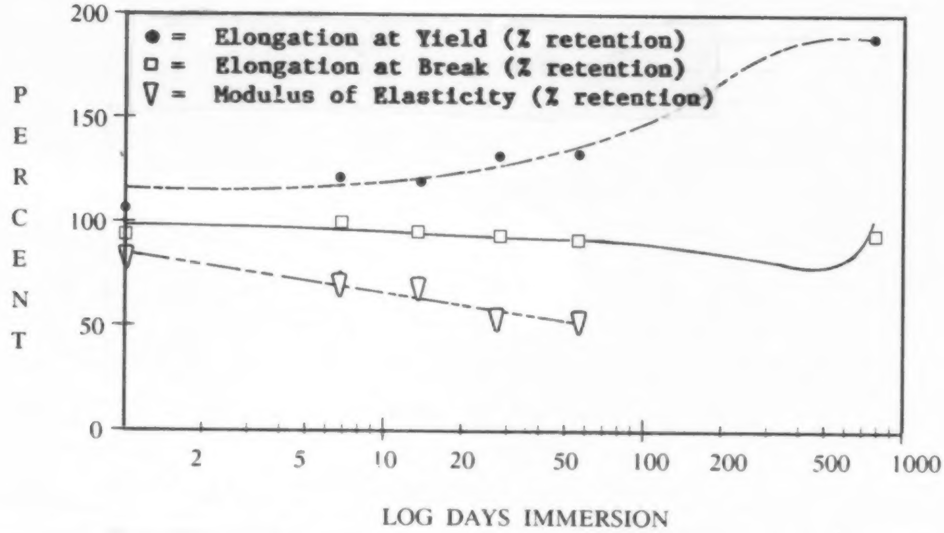


Figure 70. Percent elongation at yield, elongation at break, and modulus of elasticity change with immersion in ASTM #2 oil at 50°C for HDPE

CHLOROSULFONATED POLYETHYLENE-LOW WATER ABSORPTION (CSPE-LW)

Criteria for Determining FML Chemical Resistance

For this FML, based on the data in this project, the following criteria are proposed for determining the chemical resistance of CSPE-LW with immersion tests:

- A stabilized liner response
- A weight gain of not more than five percent for immersion testing at 23°C.
- The breaking factor must be at least 80 percent of the initial value.
- The S-100 modulus must be at least 70 percent of the initial value.
- The tear resistance must be at least 80 percent of the initial value.
- The elongation at break must not be more than 125 percent of the initial value.

These criteria are used in evaluating the FML's response to the chemicals in Table 32. Table 32 is a summary of the results of chemical resistance testing for CSPE-LW liner, and the table is explained and amplified in the sections that follow. The chemicals listed in Table 32 are grouped according to the type of response seen. Resistance or non-resistance is listed in the second to last columns, and the reasons for a non-resistance rating are given in the last column. Also listed in the table are whether temperature and concentration effects were seen,and whether the liner achieved stability in contact with the chemical exposure.

The suggested criteria for mechanical properties are based on the test reproducibility seen for this CSPE-LW liner.

Limits on weight change are specified for a 23°C immersion temperature. This was necessary since the CSPE-LW liner response was changed by elavating temperature.

These suggested criteria for breaking factor and S-100 modulus are the same as those proposed by the EPA in the document "Resistance of FMLs to Chemicals and Wastes" (27). Tear resistance was not included in the EPA list, and the limits for elongation at break were given as 70 percent retention. Because the liner tested showed no decrease in elongation for exposures at 23°C, a lower limit could not be determined from the data. This EPA document lists ten percent as the limit for weight gain, while this project specifies a five percent gain as the limit for exposures at 23°C. This more conservative limit, with temperature limitations was chosen based on the temperature effects and the limits of method reproducibility.

Comparison of Table 33 results to the EPA chemical resistance matrix mentioned above show reasonable agreement, although the matrix does not specify whether industrial grade CSPE (low water absorption) was used, or whether the material was thermoplastic or crosslinked. Results at 23°C for water and hydrochloric acid are termed resistant in both cases. Weight change in sodium hydroxide solution, however, was much higher in the NSF data than in the matrix reference, and resulted in the NSF non-resistant rating. For

TABLE 32. CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION (CSPE-LW): RESPONSE SUMMARY FOR CHEMICAL RESISTANCE

CHEMICAL NAME	CHEMICAL TYPE	TEMPER-ATURE EFFECT	CONCEN-TRATION EFFECT	TYPE OF RESPONSE	CONDITIONS	STABILITY ACHIEVED-	RESISTANT-	REASONS FOR NON-RESISTANCE *
Water	-	yes	-	Minor Change	23 C -	(N)	Y	
				Crosslinking at 50	50 C	Y	N	WG, SL
Sodium Chloride	SALT	no	no	Minor Change	23 C 10% &	Y	Y	
					50 C sat'd	Y	Y	
Potassium Dichromate	OXIDIZER	no	-	Minor Change	23 C 10%	Y	Y	
					50 C	Y	Y	
Hydrochloric Acid	ACID	yes	-	Minor Change	23 C 10%	N	Y	
				Swelling/Soft at 50	50 C	N	N	WG, SL, TL, EG
Sodium Hydroxide	BASE	yes	-	Swelling and	23 C 10%	N	N	WG
				Crosslinking	50 C	Y	N	WG, TL(m)
ASTM #2 Oil	OIL	yes	-	Swelling and	23 C 100%	N	Marg.	WG, SL(m), TL(m)
				Softening	50 C	Y	N	WG, BL, SL, TL, EG
Furfural	ALDEHYDE	yes	yes	Swelling and Softening	23 C 1%	N	Y	
					4%	N	N	WG, SL(m), TL(m)
					8%	Y	N	WG, SL, TL(m), EG
					50 C 1%	N	N	WG, SL, TL(m)
					4%	Y	N	WG, SL, TL
					8%	Y	N	WG, BL, SL, TL, EG
1,2-Dichloroethane	CHLORINATED HYDROCARBON	yes	yes	Swelling and Softening	23 C .1%	Y	Y	
					.5%	Y	N	WG(m), SL
					.8%	Y	N	WG, SL, TL, EG
					50 C .1%	N	N	WG, SL, EG(m)
					.5%	N	N	WG, SL, TL(m)
					.8%	N	N	WG, SL, TL, EG
Methyl Ethyl Ketone	KETONE	yes	yes	Swelling and Softening	23 C 3%	N	Marg.	WG(m), SL(m)
					13%	N	N	WG, SL, TL, EG
					26%	Y	N	WG, SL, TL, EG
					50 C 3%	Y	N	WG, SL, TL
					13%	Y	N	WG, BL, SL, TL, EG
					26%	Y	N	WG, BL, SL, TL, EG
Phenol	PHENOL	yes	yes	Swelling and Softening	23 C 1%	Y	Y	
					4%	Y	N	WG, SL, TL, EG
					8%	Y	N	WG, SL, TL, EG
					50 C 1%	N	N	WG, SL, TL
					4%	Y	N	WG, SL, TL, EG
					8%	N	N	WG, BL, SL, TL, EG

* WG = weight gain, BL = Breaking Factor Loss, TL = Tear Resistance Loss, SL = S-100 Loss, EG = Elongation at Break Gain
- Y = Yes, N = No, (m) = marginal or borderline results

phenol, the EPA matrix rates CSPE-LW resistant to < 30 percent phenol based on manufacturers' data. This weight data is compared with NSF data in Table 32. Although the concentration of phenol is not specified in the matrix reference, the data is similar to the NSF results for 4 percent phenol solution. CSPE was termed resistant to this phenol solution in the EPA matrix (using its weight change limit of 10 percent), whereas using the NSF criteria (5 percent weight change limit), the higher two concentrations are non-resistant.

TABLE 33. COMPARISON OF MANUFACTURER'S DATA TO NSF DATA FOR CSPE-LW RESISTANCE TO PHENOL.

DAYS IMMERSION	PERCENT WEIGHT CHANGE			
	Matrix Reference (24°C, < 30% phenol)	NSF Data (23°C, phenol)		
		1%	4%	8%
1		1	3	7
3	5.6			
7		2	6	11
11	6.0			
14		2	6	9
28		2	6	9
36		2	6	9
46		2	6	11
56		2	7	10
81	6.0			
130		2	6	10
137		2	7	12
241		2	7	13

Response Time and Stability

The maximum immersion time for this liner was eight months. Over half of the exposed CSPE-LW liners showed weight stability within this period, but other types of FML also sometimes required longer than eight months to achieve weight stability.

Response time, or the time required for the liner to stabilize in a given solution, varied from less than seven days to more than eight months for CSPE-LW. In most cases, though, a four-month exposure time would appear to be sufficient to determine chemical resistance. There were fifteen exposures for which CSPE-LW liner did not show stability within eight months. The liner appeared to be resistant to only three of these non-stabilized exposures (water, HCl, and 1 percent furfural, all at 23°C). In the other twelve cases, there were multiple indicators of non-resistance.

Magnitude of Liner Response

A two-part evaluation of the magnitude of physical property change was not possible in evaluating CSPE-LW chemical resistance. There is no Standard 54 table for unsupported CSPE-LW FML. Only a maximum allowable percent change based on the control (unexposed) results was determined.

Changes in weight were always positive for CSPE-LW immersion tests; no samples showed a weight loss. Weight gains ranged from zero to over one hundred percent (ASTM #2 oil at 50°C).

Breaking strength and elongation at break showed both gain and loss due to chemical immersion. Breaking strength ranged from 30 percent retention (in saturated MEK) to 130 percent retention (in NaOH). Elongation ranged from 54 percent retention (in saturated furfural) to 188 percent retention (in ASTM #2 oil). In general, elongation decreased as breaking strength increased.

Tear resistance and S-100 modulus showed either minor change only or losses. Retention of tear resistance ranged from 21 percent (two months in ASTM #2 oil at 50°C) to 102 percent (one day in HCl). S-100 modulus ranged from 7 percent retention (eight months in ASTM #2 oil at 50°C) to 101 percent retention (two months in NaOH).

Percent Change from Initial Value—

Limits on allowable change for the CSPE-LW liner were set by looking primarily at the 23°C data in order to separate the effects of temperature from the effects of the chemical immersion. The material is sensitive to temperature, and tends to slowly crosslink on exposure to heat and moisture. The effect of crosslinking is increased breaking strength and decreased elongation. General chemical resistance improves with aging (from crosslinking), but the liner becomes difficult to seam. The higher temperature exposures in general had a wider range of weight gain, especially for the organic immersion solutions.

Figure 71 shows the relationship between breaking factor and weight change at 23°C. Breaking factor reproducibility in this CSPE-LW liner was approximately 15 percent, measured by looking at those samples with little or no weight change. A limit on change of 20 percent was chosen as a conservative estimate of real material degradation.

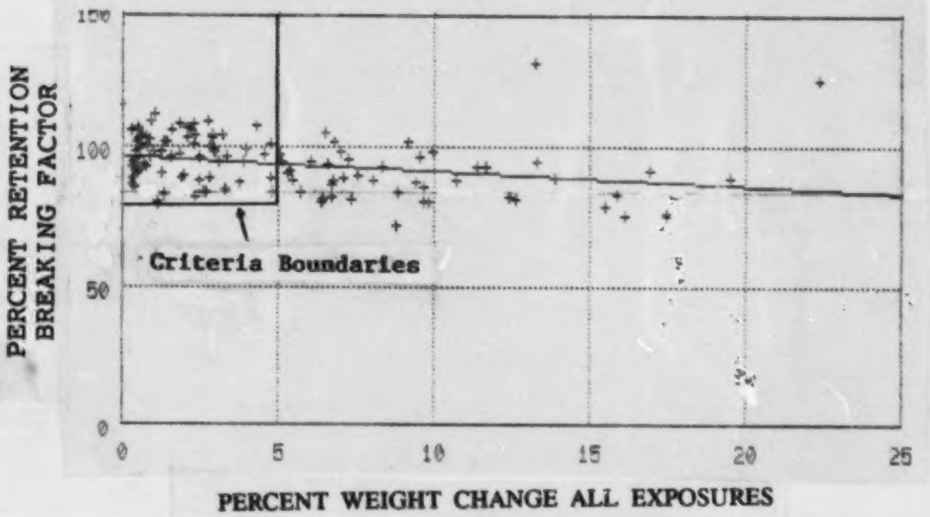


Figure 71. Relationship between breaking factor and weight change at 23°C for CSPE-LW

The S-100 modulus tended to decrease as a result of chemical immersion. Figure 72 shows the retention of S-100 modulus as a function of weight change. This figure contains data from both temperatures, since the S-100 modulus response was similar (ie., at the higher immersion temperature, although the

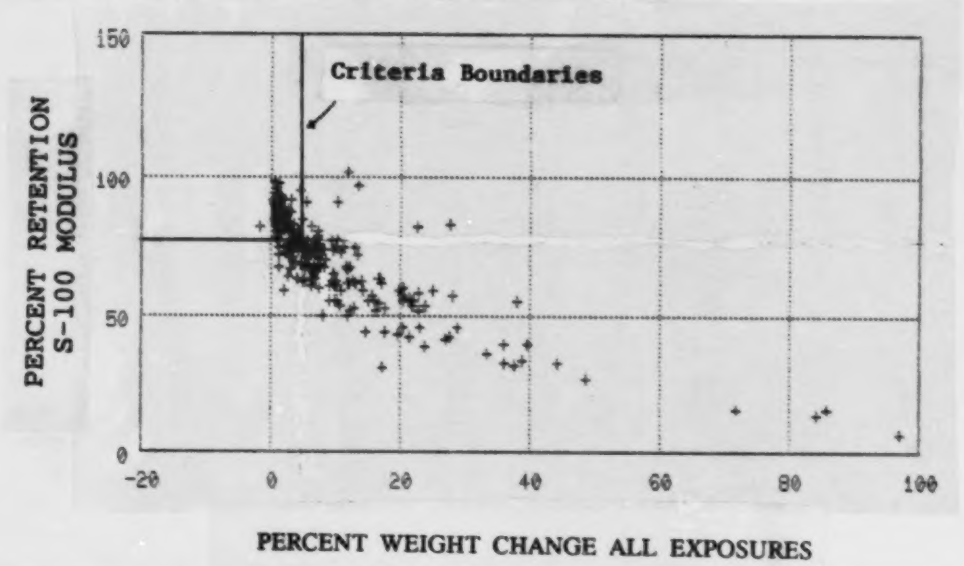


Figure 72. Relationship between S-100 modulus and weight change for CSPE-LW

weight gain may be greater, the S-100 modulus change is also proportionally greater). Although almost all immersion samples retained less than 100 percent of the modulus, the variability around zero weight change appears to be about percent. This represents inherent property variability after immersion but with no other effect evident. A limit of 30 percent loss of S-100 modulus was chosen as an indicator of real material degradation.

Like the S-100 modulus, retention of tear resistance was almost always less than 100 percent, and temperature did not change the basic response. To focus on the lower portion of the weight range, the data from 23°C exposures only is shown in Figure 73. Tear resistance variability around the zero weight change point is about ten percent, with a clear relationship between weight gain and loss of tear resistance. (Above a twenty percent weight gain, the tear resistance response is not linear with weight gain, but look similar to the curve for S-100 modulus (Figure 72).

A limit for weight gain for this CSPE-LW liner was set at 5 percent for a 30 mil liner. This limit was set using Figures 71 and 72, selecting the weight gain for which the S-100 modulus and tear resistance properties fell below the percent change limit. The 5 percent limit is smaller than the limit in the EPA guide (27), which lists a ceiling 10 percent weight gain, but is justified by the drop in the tensile properties at five percent weight gain.

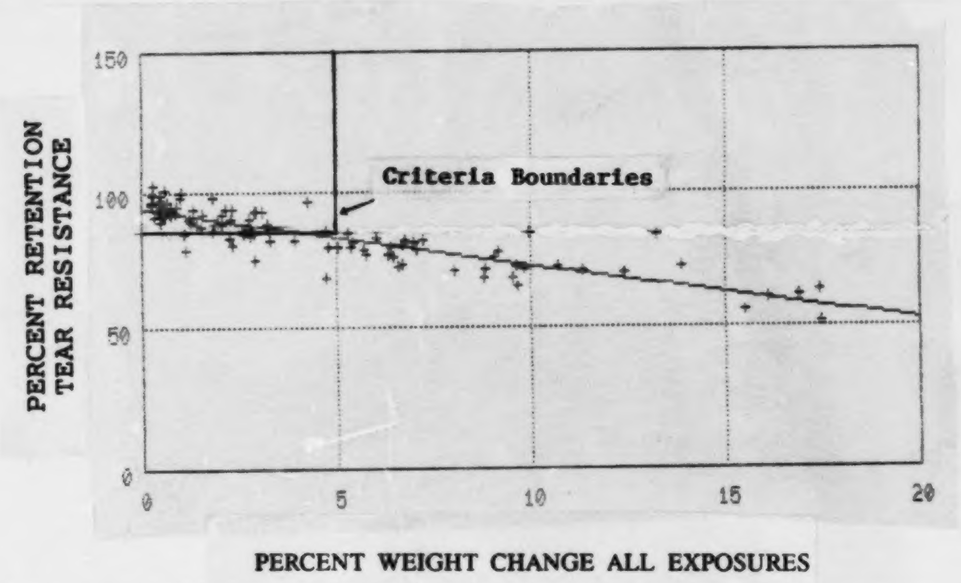


Figure 73. Relationship between tear resistance and weight change at 23°C for CSPE-LW

Retention of ultimate elongation is shown as a function of weight change in Figure 74. Variability in elongation is about 20 percent around the zero weight gain point. Data for both temperatures are included in the figure for illustration. Two separate types of response can be seen. For most immersions, elongation at break increased, probably due to the softening effect from liquid absorption. Some immersion samples, however, retained less elongation after immersion and appeared to be crosslinking. Most of the samples with decreased elongation were exposed at 50°C, in NaOH or water.

Because the trend for CSPE-LW was for the elongation at break to increase as a result of chemical immersion at 23°C, and because crosslinking is not considered material degradation, no lower limit on percent retention could be determined and probably is not appropriate. To set a limit of allowable

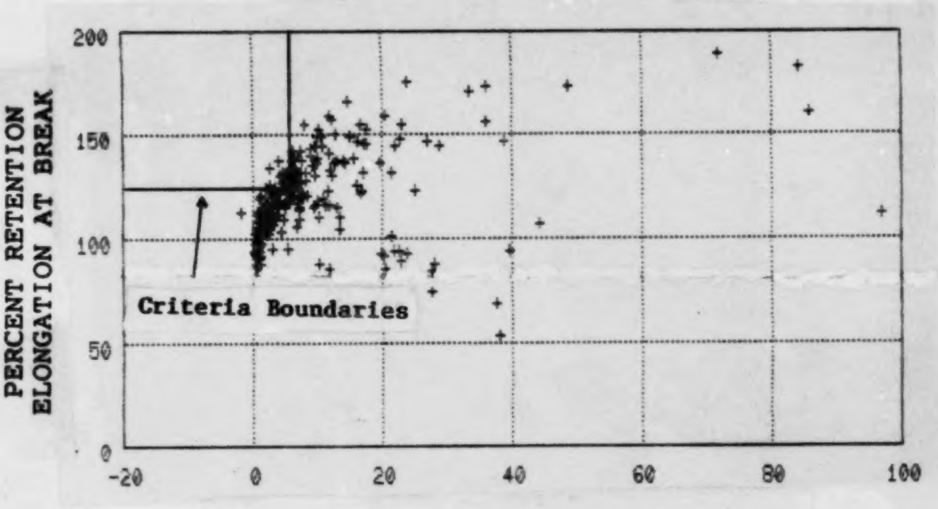


Figure 74. Relationship between elongation at break and weight change for CSPE-LW

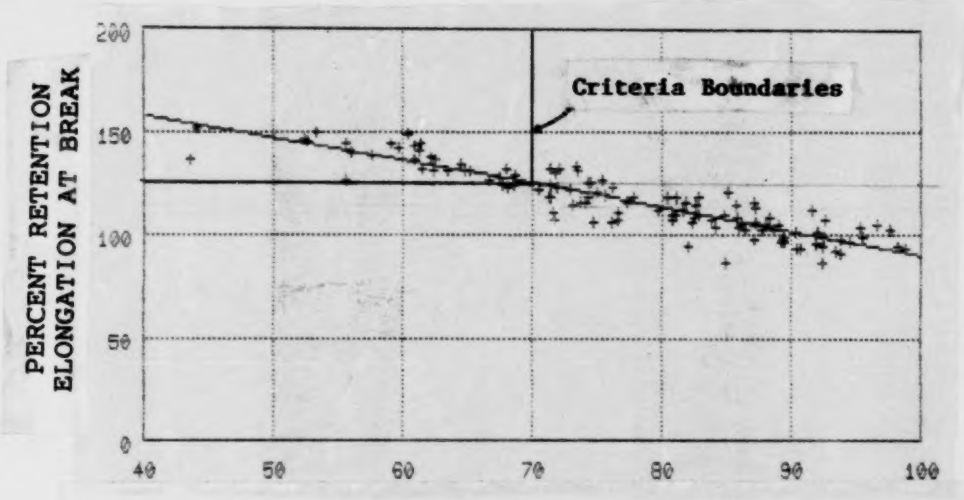
increase in elongation, the relationship between elongation and other indicators was studied. Figures 75 and 76 show the relationship between elongation at break and S-100 modulus and tear resistance, respectively. An increase in elongation of 25 percent (125 percent retention) roughly corresponds to the limits set on both properties.

Types of Effects

The results in Table 33 for CSPE-LW are grouped according to the type of effects seen. A temperature or concentration effect is noted in the third and fourth columns. Three basic types of response to chemical immersion were observed with this liner: minor change, crosslinking, and swelling and softening.

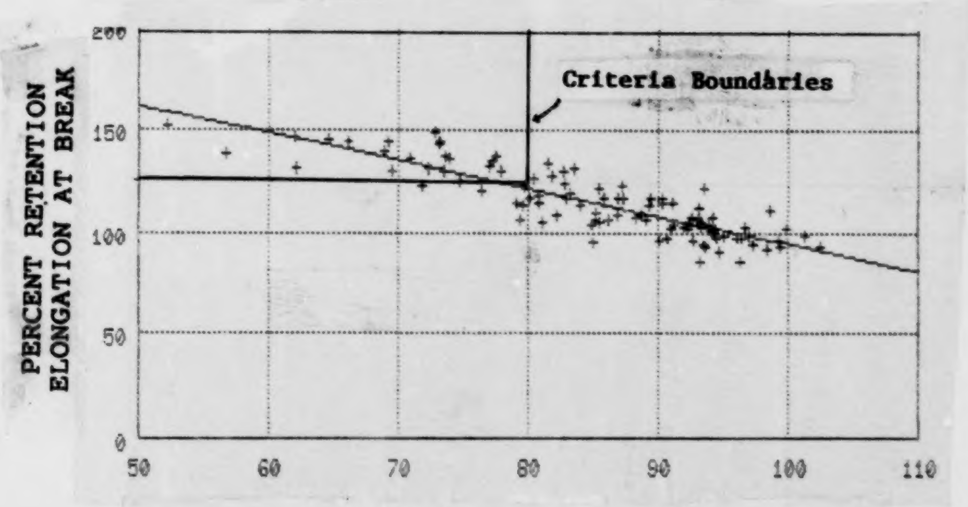
Temperature Effects—

The response of this liner to increased immersion temperature shows that higher temperatures (at least up to 50°C) can sometimes accelerate the response, but must be interpreted with caution. Crosslinking of the CSPE-LW



PERCENT RETENTION OF S-100 MODULUS, ALL EXPOSURES AT 23°C

Figure 75. Relationship between elongation at break and S-100 modulus at 23°C for CSPE-LW



PERCENT RETENTION OF TEAR, ALL EXPOSURES AT 23°C

Figure 76. Relationship between elongation at break and tear resistance at 23°C for CSPE-LW

liner is a known response to heat and moisture. For water and sodium hydroxide, increased evidence of crosslinking was seen at 50°C. For these two exposures, the breaking strength increased with time, and the elongation at break decreased.

Increasing the temperature to 50°C generally resulted in more weight gain, and more severe losses of property, especially for organic solutions. In these cases, the increased temperature appeared to accelerate the test.

Concentration Effects—

Four organic chemicals were tested in three concentrations. All responses seen with these chemicals were affected by concentration, with more weight gain at higher concentration.

Indicators of Non-Resistance

For CSPE-LW, the most sensitive indicators of non-resistance are weight gain, decrease of S-100 modulus, and decrease of tear resistance. As discussed above, a weight gain of 5 percent corresponds to a 20 percent drop in tear resistance and a 30 percent drop in S-100 modulus.

Changes in breaking strength can indicate material degradation, but the measurement is much less sensitive. As shown previously in Figure 71, the 15 percent variability in breaking strength around zero weight gain means that changes in breaking strength less than 15 percent are not conclusive. Only for weight gains above 20 percent are conclusive changes in breaking factor seen.

Elongation at break is at best an indirect indicator of chemical non-resistance, since an increase in elongation can be correlated with decreases in S-100 modulus and tear resistance. Decreasing elongation, however, is not a good indicator of CSPE-LW chemical non-resistance since the FML may be crosslinking in response to heat and moisture (3).

Minor change--

In water (23°C only), salt, potassium dichromate, and hydrochloric acid (23°C only) minor changes in weight and mechanical properties were observed . An example is shown in Figure 77. This figure shows the response of CSPE-LW liner to a saturated salt solution at 50°C. No significant weight gain was recorded over the eight month immersion period. Both elongation at break and breaking strength were unchanged from their initial values. S-100 modulus and tear resistance were slightly lower.

Crosslinking--

In water (50°C), and in sodium hydroxide solutions at both temperatures evidence of crosslinking was seen. While not evidence of non-resistance in itself, crosslinking should be noted as a response. Figure 78 shows the response of CSPE-LW to 10 percent sodium hydroxide at 50°C. Weight gain was about 25 percent, and may have stabilized after 100 days. Elongation shows a downward trend with time, beginning after about one month immersion time. At the same time, the breaking strength increased to 130 percent of its initial value. It should be noted that the S-100 modulus, not shown on this figure, remained relatively steady and did not show the same increase as breaking factor. The responses may have not yet stabilized with respect to time.

Swelling and softening--

In all four organic series (MEK, phenol, furfural, and 1,2-dichloroethane), in ASTM #2 oil, and in hydrochloric acid (50°C only), swelling and softening was the primary response of the CSPE-LW liner. Exposure to these chemicals caused weight gain, reduced S-100 modulus, reduced tear resistance, and an increase in elongation at break. For the organic chemical series, only the lowest concentrations of each tested at 23°C did not change the CSPE-LW enough for it to be considered non-resistant.

At 50°C, the initial increase in elongation decreased with time for these exposures, and the breaking strength tended to remain the same or decrease. While some crosslinking may be occuring, caused by temperature, the material also appears to be weakening as a result of the exposure. As shown in

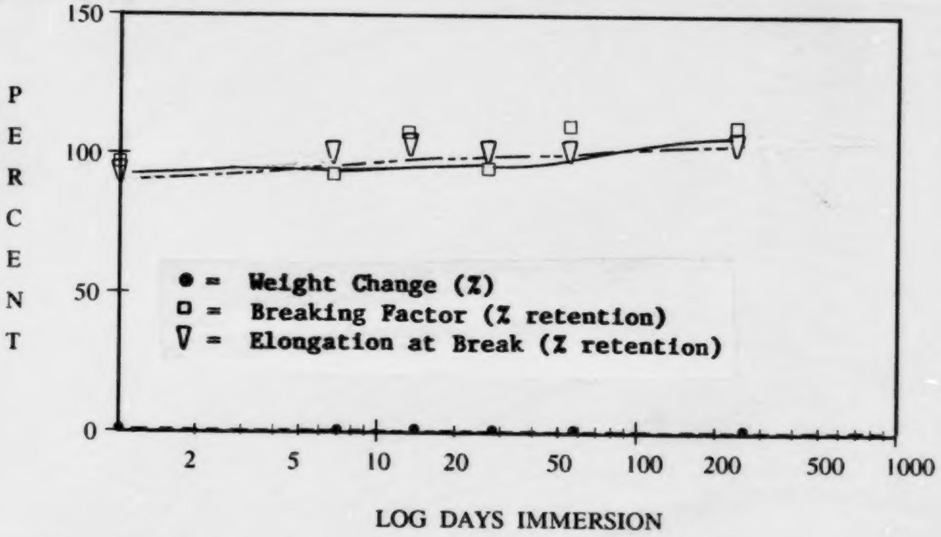


Figure 77. Physical property change with immersion in saturated (35 percent) salt solution at 50°C for CSPE-LW

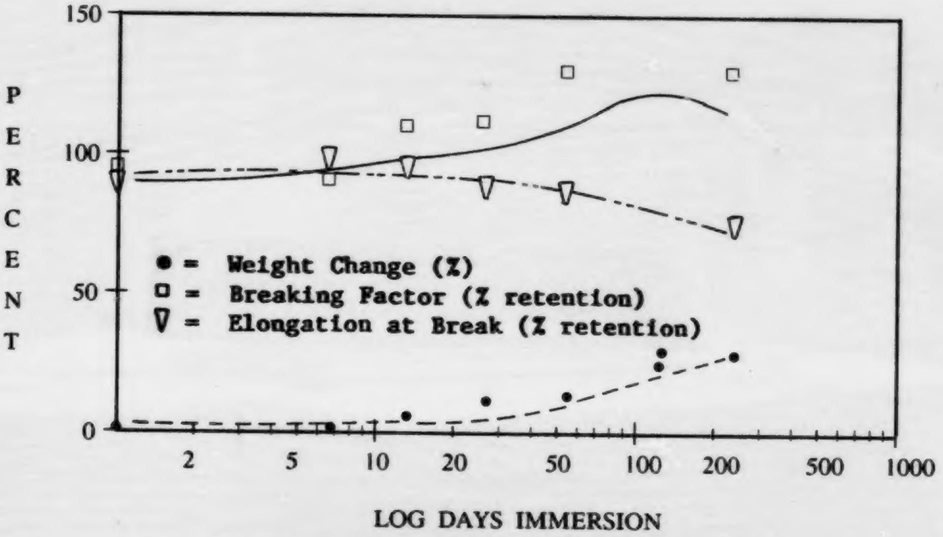


Figure 78. Physical property change with immersion in 10 percent sodium hydroxide solution at 50°C for CSPE-LW

Table 32, breaking strength is below 80 percent retention only for the higher concentrations of furfural, MEK, and phenol at 50°C only.

Figures 79 and 80 show the CSPE-LW response to ASTM #2 oil at both temperatures. At 23°C (Figure 79), the weight is above ten percent and still increasing with time, although the breaking strength and elongation show no effect. Retention of S-100 modulus and tear resistance, not shown are borderline and had not stabilized within the testing period. At 50°C (Figure 80) the response is much faster and more severe. Weight gain has stabilized at 100 percent, and breaking strength at around 50 percent retention. The initial large increase in elongation at break peaked at fourteen days and declined to just over 100 percent after eight months. The liner was quite soft and swollen after exposure to the hot oil.

The response to 8 percent phenol is shown in Figures 81 and 82. These figures again show the swelling response, and the difference between exposure at 23 and 50°C. Weight gain is much higher at 50°C than at 23°C and does not stabilize at the higher temperature. Elongation at break increases immediately and then declines again with time at 50°C.

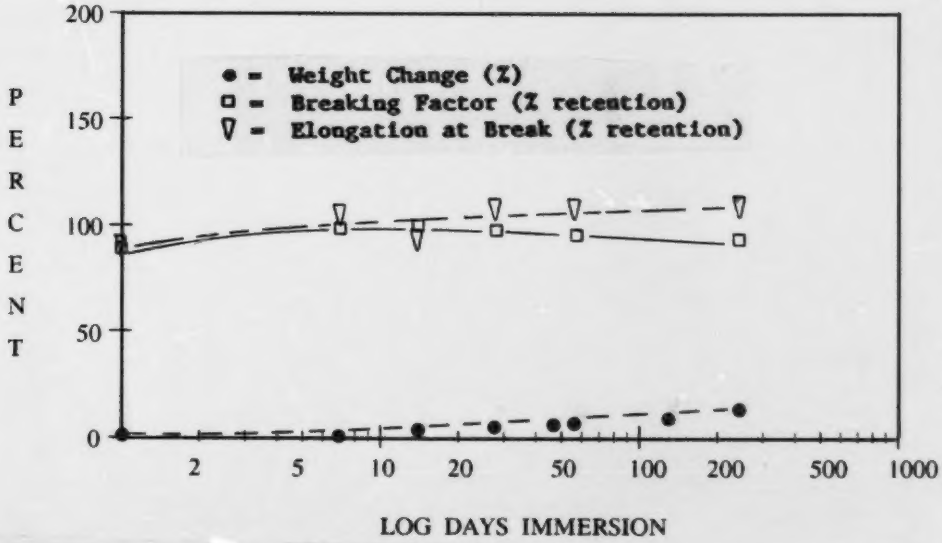


Figure 79. Physical property change with immersion in ASTM #2 oil at 23°C for CSPE-LW

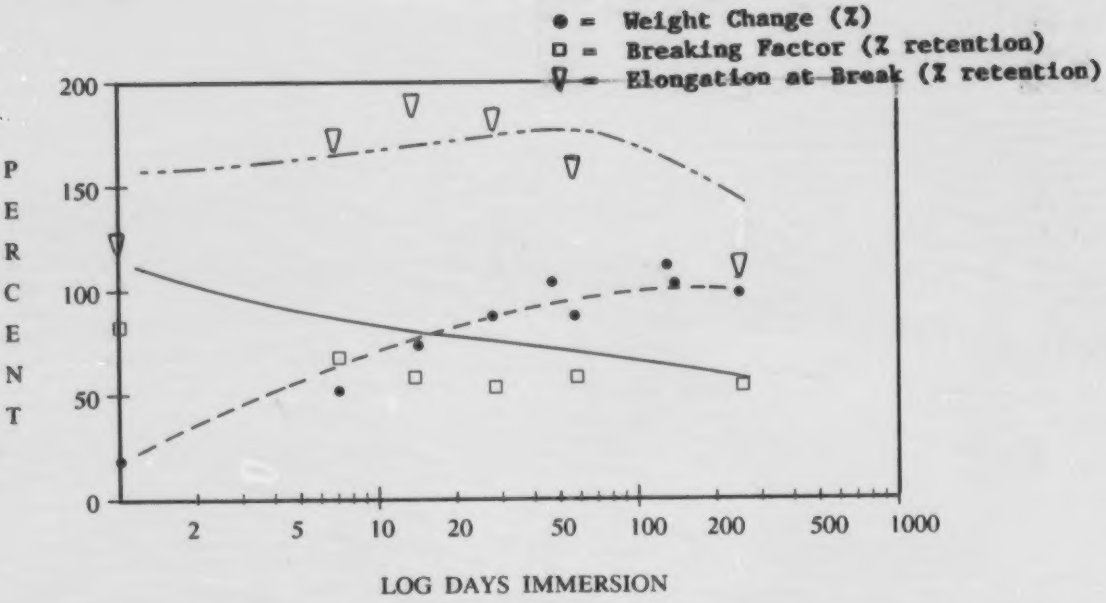


Figure 80. Physical property change with immersion in ASTM #2 oil at 50°C for CSPE-LW

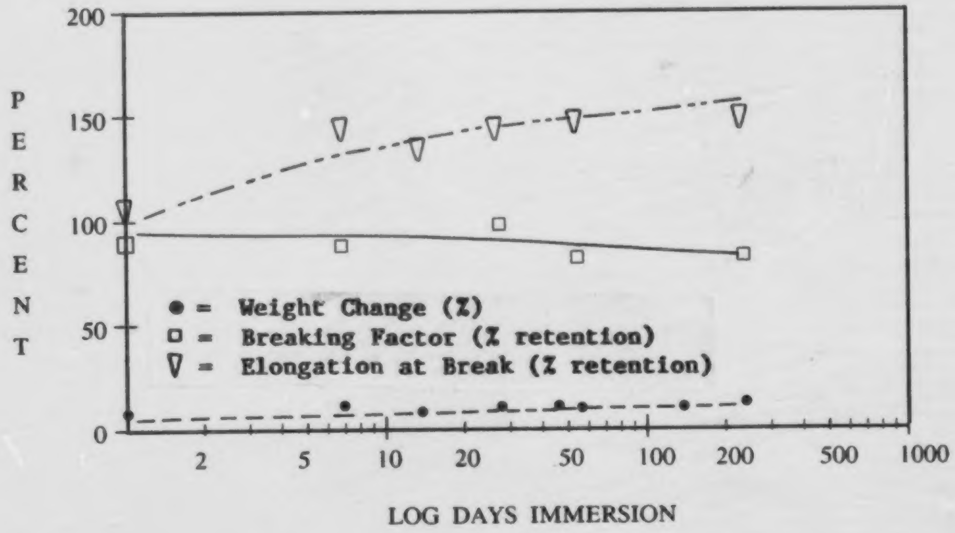


Figure 81. Physical property change with immersion in 8 percent phenol at 23°C for CSPE-LW

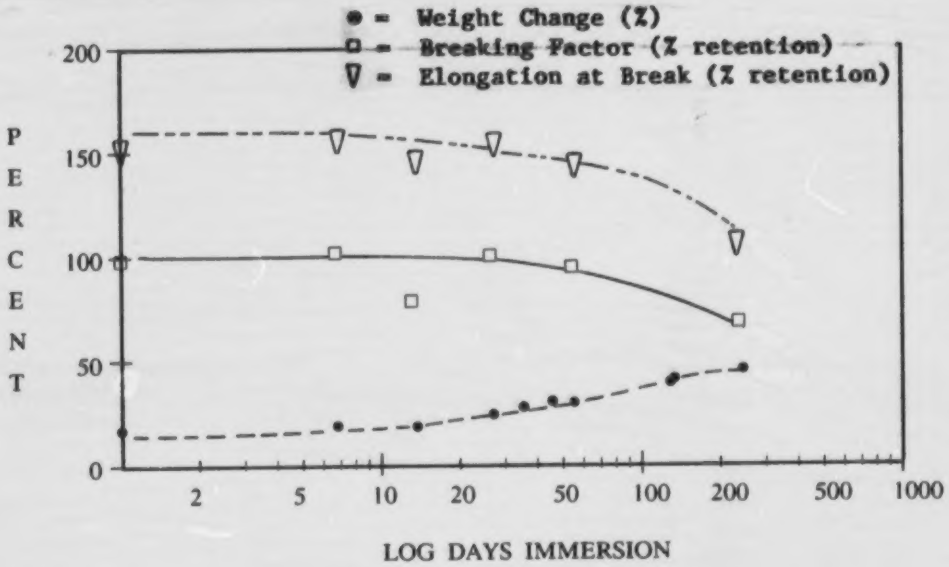


Figure 82. Physical property change with immersion in 8 percent phenol at 50°C for CSPE-LW

REFERENCES

1. U.S. Code of Federal Regulations Part 40, Sections 264.221 and 264.301.

2. Tratnyek, Joseph, Peter Costas and Warren Lyman. Test Methods for Determining the Chemical Waste Compatibility of Synthetic Liners. U.S. EPA Report No. 600/2-85-029, U.S. Environmental Protection Agency, Cincinnati, Ohio, 1984.

3. U.S. Environmental Protection Agency. Draft Minimum Technology Guidance on Double Liner Systems for Landfills and Surface Impoundments -- Design, Construction, and Operation, December 1984.

4. Barton, Allen F. CRC Handbook of Solubility Parameters and Other Cohesion Parameters. CRC Press, Inc., Boca Raton, Florida, 1983.

5. Personal communication, Mary Ann Curran, October 1985.

6. Rossiter, Walter J. A Methodology for Developing Tests to Aid Service Life Prediction of Single-Ply Roofing Membranes. Paper presented at the NBS/NRCA 7th Conference on Roofing Technology, 1983.

7. National Sanitation Foundation. Standard 54 for Flexible Membrane Liners. NSF, Ann Arbor, MI, 1985.

8. U.S. Environmental Protection Agency. Compatibility Test for Wastes and Membrane Liners, Method 9090, October 1984.

9. American Society for Testing and Materials. Standard Definitions of Terms Relating to Plastics. ASTM D883-83, Section 8, Vol. 08.04, pp. 22-37. ASTM Philadelphia, PA, 1986.

10. U.S. Environmental Protection Agency. Lining of Waste Impoundment and Disposal Facilities. Office of Solid Waste and Emergency Response Report No. SW-870, March 1983.

11. Hall, Christopher. Polymer Materials, An Introduction for Technologists and Scientists. John Wiley and Sons.

12. Seymour, Raymond B. and Robert H. Steiner. Plastics for Corrosion Resistant Applications. Reinhold Publishing Corp., New York, 1955.

13. Rosen, Stephen L. Fundamental Principles of Polymeric Materials. SPE Monograph Series, John Wiley and Sons, 1982.

14. Quackenbos, H.M. Plasticizers in Vinyl Chloride Resins: Migrations of Plasticizer. Industrial and Engineering Chemistry, June 1984.

15. Reed, M.C., H.F. Klemm and E.F. Schultz. Plasticizers in Vinyl Chloride Resins: Removal by Oil, Soapy Water, and Dry Powders. Industrial and Engineering Chemistry, June 1954.

16. Agranoff, J., ed. Modern Plastics Encyclopedia. McGraw-Hill, Inc., Volume 59, October 1983.

17. Gibbons, Gregory M., and Jonathan W. Braswell. U.S. Army Toxic and Hazardous Materials Agency. Engineering and Development Support of General Decon Technology for the Darcom Installation Restoration Program: Task 1. Lagoon/Landfill Liner Compatibility Testing with Explosives, June 1983.

18. American Society for Testing and Materials. Standard Test Method for Resistance of Plastics to Chemical Reagents. ASTM D543-67, reapproved 1978.

19. Morrison, W.R., and L.D. Parkhill. Evaluation of Flexible Membrane Liner Seams. U.S. EPA Report No. 600/2-87-015, February 1987.

20. Hawley, Gessner G. Condensed Chemical Dictionary, Tenth Edition. Van Nostrand Reinhold Company, New York, 1981.

21. American Society for Testing and Materials. Standard Test Method for Rubber Property - Effects of Liquids. ASTM D471-75, Section 8, Vol. 08.01, pp. 123-130. ASTM Philadelphia, PA, 1986.

22. Perry's Chemical Engineering Handbook, 5th Edition, McGraw-Hill, New York, 1973.

23. The General Chemical Resistance of Various Elastomers. 1979 Yearbook of the Los Angeles Rubber Group, Inc., 1979.

24. Chemical Resistance Rating Guide. Gundle Corp.

25. Comparative Properties of Typical Commercial Elastomers. DuPont Elastomers Polymer Selection Guide. DuPont Company, Elastomer Chemicals Department, Wilmington, DE.

26. Chemical Resistance. Schlegel-Chemische Corp.

27. Schwope, Arthur D., Peter Costas and Warren J. Lyman. Resistance of Flexible Membrane Liners to Chemicals and Wastes. U.S. EPA Report No. 600/2-85-127, January 1986.

28. CRC Handbook of Chemistry and Physics, 59th Edition, 1978-79.

29. Haxo, H.E., Jr., et al. Liner Material Exposed to Hazardous and Toxic Waste. Final Report to the U.S. Environmental Protection Agency, Cincinnati, Ohio, 1984.

30. Tod Baseden, DuPont Co., personal communication.

31. Dixon, W.J. BMPD Statistical Software Manual, University of California Press, Berkley, 1985.

32. Finney, D.J. Statistical Methods in Biological Assay, 2nd Edition. Hafner Publishing, New York, 1964.

APPENDIX A

ADVISORY COMMITTEE MEMBERS

PROJECT ADVISORY COMMITTEE
CHEMICAL RESISTANCE OF FLEXIBLE MEMBRANE LINERS

Mr. Tod Baseden
Polymer Products Department
E. I. duPont Company
Chestnut Run
Wilmington, DE 19898
(302) 999-2410

Joan B. Berkowitz
President/CEO
Risk Science International
1101 30th Street, NW
Washington, DC 20007
(202) 342-2206

Mr. Allen Crepeau
Uniroyal Chemical
Service Center
Spencer Street, Building 112
Naugatuck, CT 06770
(203) 723-3825

Dr. Stacy L. Daniels
(Chemical Manufacturers Association)
Dow Chemical, USA
734 Building
Midland, MI 48667

Dr. Gerald L. DePoorter
Los Alamos National Laboratory
DAD/NP MS F671
PO Box 1663
Los Alamos, NM 87545
(505) 667-1033

Mr. Norman R. Francingues
Chief, Water Supply & Waste
Treatment Group
US Army Corp of Engineers
Waterways Experiment Station
PO Box 631
Vicksburg, MS 39180
(601) 636-3111

Mr. Ron Frobel
CHEMIE LINZ
1726 Cole Blvd
Suite 325
Golden, CO 80401
(303) 278-4529

Mr. Dean M. Golden
Electric Power Research Institute
PO Box 10412
Palo Alto, CA 94303
(415) 855-2516

Dr. Henry Haxo
Matrecon, Incorporated
81 Atlantic Avenue
Alameda, CA 94501
(415) 521-1762

Mr. Larry Kamp
Matrecon, Incorporated
81 Atlantic Avenue
Alameda, CA 94501
(415) 521-1762

Dr. Robert M. Koerner
Department of Civil Engineering
Drexel University
Philadelphia, PA 19104
(215) 895-2343

Mr. James Krider
US Soil Conservation Service
5248 South Agriculture Building
PO Box 2890
Washington, DC 20013
(202) 447-5023

Mr. John Lawrence
Society of the Plastics Industry
355 Lexington Avenue
New York, NY 10017
(212) 573-9400

Mr. Paul W. Lussier
Supervisor, R&D
Canadian General-Tower
PO Box 160
Cambridge, Ontario
Canada N1R 5T7
(519) 623-1630

Mr. Don Mitchell
Battelle Northwest
324-TR15
PO Box 999
Richland, WA 99352
(509) 376-0983

Mr. Don Patterson
Polysar Incorporated Rubber
Technical Centre
1501 Commerce Drive
Stow, OH 44224

Mr. Roger Pennifill
US Nuclear Regulatory Commission
MS 623 SS
Washington, DC 20555
(301) 427-4536

Mr. Arnold G. Peterson
Stevens Elastomeric and Plastics
PO Box 431
Easthampton, MA 01027
(413) 527-0700

Mr. Paul A. Pezzoli
Dow Chemical Company
Building 2307, Box 150
Plaquemine, LA 70764
(504) 382-8275

Dr. Frederick G. Pohland
Department of Civil Engineering
Georgia Institute of Technology
Atlanta, GA 30332
(404) 894-2265

Mr. David Eakin
President
Gundle Lining Systems
1340 East Richey Road
Houston, TX 77073
(713) 443-8564

Mr. Alfred Silverman
Spartan-Aqualon Corporation
17 Cotters Lane
East Brunswick, NJ 28816
(201) 238-5100

Mr. Wayne E. Sisk
Commander/US Army Toxic and
Hazardous Materials Agency
ATTN: DRX-TH-TE-D
Aberdeen Proving Ground, MD 21010
(301) 671-2054

Dr. Edward D. Smith
US Army-CERREL
Environmental Group
PO Box 4005
Champaign, IL 61820
(217) 352-6511

Mr. Lloyd Timblin, Jr.
Chief, Applied Sciences Branch
Bureau of Reclamation
Engineering and Research Center
Building 67, DFC
Code D-1520
PO Box 25007
Denver, CO 80225
(303 236-8098

Mr. Richard Ward
B.F. Goodrich Company
PO Box 657
Marietta, OH 45750
(614) 373-6611

Mr. William E. Witherow
Product Manager
Carlisle Syntec Systems
PO Box 99
Carlisle, PA 17013
(717) 245-7000

Mr. Ralph Woodley
Technical/Product Manager
Burke Rubber Company
2250 South Tenth Street
San Jose, CA 95112
(408) 297-3500

Ms. Lynn Zwickert
Senior Product Representative
Hercules, Incorporated
Hercules Plaza
Wilmington, DE 19899
(302) 594-6358

APPENDIX B

INITIAL SCREENING RESULTS

POLYVINYL CHLORIDE: INITIAL SCREENING, RETENTION OF PROPERTIES, 23^{o}C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		1 2 DICHLOROETHANE .9%			
7 DAY IMMERSION	4.4	.6	.9	.2	1.7
7 DAY AIR-DRIED	1.5	.3	1.0	2.2	3.5
		1 2 DICHLOROETHANE .5%			
7 DAY IMMERSION	6.6	.6	1.1	.9	2.7
7 DAY AIR-DRIED	1.6	.3	1.0	1.9	3.2
		1 2 DICHLOROETHANE 100.0%			
7 DAY IMMERSION	470.7	77.1	57.3	94.9	442.9
7 DAY AIR-DRIED	*	*	*	*	*
		FURFURAL 1.0%			
7 DAY IMMERSION	2.7	.3	.7	1.0	2.1
7 DAY AIR-DRIED	.2	.3	.1	*	.2
		FURFURAL 5.0%			
7 DAY IMMERSION	15.9	4.8	4.7	5.3	15.5
7 DAY AIR-DRIED	6.2	1.9	1.5	2.2	5.7
		FURFURAL 8.0%			
7 DAY IMMERSION	37.3	12.1	8.9	7.5	31.1
7 DAY AIR-DRIED	15.2	6.0	3.4	.7	10.4
		FURFURAL 100.0%			
7 DAY IMMERSION	70.2	18.8	14.6	18.5	61.4
7 DAY AIR-DRIED	59.0	*	8.5	11.0	*
		METHYL ETHYL KETONE 1.0%			
7 DAY IMMERSION	1.7	.6	.6	.9	2.1
7 DAY AIR-DRIED	.4	.3	.2	.2	.3
		METHYL ETHYL KETONE 10.0%			
7 DAY IMMERSION	13.1	4.8	3.6	4.8	13.8
7 DAY AIR-DRIED	.4	1.0	1.1	.2	.4
		METHYL ETHYL KETONE 26.0%			
7 DAY IMMERSION	67.8	21.8	13.1	21.2	66.9
7 DAY AIR-DRIED	.3	1.9	4.2	1.2	1.2

POLYVINYL CHLORIDE: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		METHYL ETHYL KETONE 99.0%			
7 DAY IMMERSION	*	*	*	*	*
7 DAY AIR-DRIED	*	*	*	*	*
		ASTM #2 OIL SATURATED			
7 DAY IMMERSION	.9	*	.3	.4	.1
7 DAY AIR-DRIED	.6	*	.4	.8	1.2
		ASTM #2 OIL 100.0%			
7 DAY IMMERSION	.6	.3	.5	.5	.7
7 DAY AIR-DRIED	2.5	.3	1.1	1.0	2.4
		PHENOL 1.0%			
7 DAY IMMERSION	3.1	1.3	1.1	.8	3.2
7 DAY AIR-DRIED	2.1	.3	.8	.7	1.8
		PHENOL 5.0%			
7 DAY IMMERSION	6.8	2.9	1.3	2.0	6.3
7 DAY AIR-DRIED	4.5	1.3	1.1	1.4	3.9
		PHENOL 8.0%			
7 DAY IMMERSION	.5	.3	1.5	1.8	3.0
7 DAY AIR-DRIED	4.8	11.9	3.0	3.1	17.2
		PHENOL 88.0%			
7 DAY IMMERSION	4.2	1.3	3.5	3.2	7.8
7 DAY AIR-DRIED	11.1		6.4	6.1	12.1

CHLORINATED POLYETHYLENE: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
1 2 DICHLOROETHANE .9%					
7 DAY IMMERSION	21.4	26.0	.9	9.4	36.7
7 DAY AIR-DRIED	3.3	14.4	1.6	3.9	16.9
1 2 DICHLOROETHANE .5%					
7 DAY IMMERSION	12.7	13.8	.5	4.7	18.6
7 DAY AIR-DRIED	2.9	3.4	.5	1.3	4.3
1 2 DICHLOROETHANE 100.0%					
7 DAY IMMERSION	*	*	*	*	*
7 DAY AIR-DRIED	*	*	*	*	*
FURFURAL 1.0%					
7 DAY IMMERSION	2.5	2.0	.1	.2	2.3
7 DAY AIR-DRIED	1.2	.3	*	*	.4
FURFURAL 5.0%					
7 DAY IMMERSION	19.5	17.5	1.6	5.7	22.3
7 DAY AIR-DRIED	10.5	8.6	2.5	2.1	8.1
FURFURAL 8.0%					
7 DAY IMMERSION	65.4	49.5	2.2	19.6	74.8
7 DAY AIR-DRIED	20.1	17.7	2.7	9.0	24.9
FURFURAL 100.0%					
7 DAY IMMERSION	79.5	47.3	3.7	20.6	71.0
7 DAY AIR-DRIED	48.4	36.0	10.7	12.5	36.5
METHYL ETHYL KETONE 1.0%					
7 DAY IMMERSION	3.0	3.1	*	.5	3.6
7 DAY AIR-DRIED	.2	.3	*	.3	.7
METHYL ETHYL KETONE 10.0%					
7 DAY IMMERSION	27.2	30.5	3.3	12.9	42.5
7 DAY AIR-DRIED	3.2	9.9	2.7	3.2	10.4
METHYL ETHYL KETONE 26.0%					
7 DAY IMMERSION	191.3	131.7	4.4	44.8	220.6
7 DAY AIR-DRIED	92.1	98.6	10.2	31.4	134.3

CHLORINATED POLYETHYLENE: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		METHYL ETHYL KETONE 99.0%			
7 DAY IMMERSION	*	*	*	*	*
7 DAY AIR-DRIED	*	*	*	*	*
		ASTM #2 OIL SATURATED			
7 DAY IMMERSION	2.4	8.2	*	.4	7.8
7 DAY AIR-DRIED	.5	.3	.1	.2	.4
		ASTM #2 OIL 100.0%			
7 DAY IMMERSION	1.5	1.7	.1	.3	2.1
7 DAY AIR-DRIED	.7	1.0	.1	.2	.8
		PHENOL 1.0%			
7 DAY IMMERSION	2.4	2.4	.2	.2	2.8
7 DAY AIR-DRIED	.1	*	.2	*	.2
		PHENOL 5.0%			
7 DAY IMMERSION	11.2	10.3	.3	2.0	12.9
7 DAY AIR-DRIED	7.0	3.1	.5	.8	4.4
		PHENOL 8.0%			
7 DAY IMMERSION	26.3	23.2	.6	5.9	31.3
7 DAY AIR-DRIED	10.8	10.2		3.1	13.7
		PHENOL 88.0%			
7 DAY IMMERSION	42.7	36.9	.2	9.2	49.1
7 DAY AIR-DRIED	21.8	21.0	1.9	5.4	25.2

ETHYLENE PROPYLENE DIENE MONOMER: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		METHYL ETHYL KETONE 99.0%			
7 DAY IMMERSION	16.1	8.8	7.4	5.3	20.1
7 DAY AIR-DRIED	20.9	11.6	9.8	7.5	26.2
		ASTM #2 OIL SATURATED			
7 DAY IMMERSION	1.5	.3	.4	.1	.8
7 DAY AIR-DRIED	1.2	*	.5	.7	1.2
		ASTM #2 OIL 100.0%			
7 DAY IMMERSION	40.5	15.1	13.9	11.3	45.8
7 DAY AIR-DRIED	40.3	15.1	14.4	11.3	46.5
		PHENOL 1.0%			
7 DAY IMMERSION	.5	.3	.1	.4	.1
7 DAY AIR-DRIED	*	*	*	.4	.4
		PHENOL 5.0%			
7 DAY IMMERSION	1.0	.2	.1	.3	.6
7 DAY AIR-DRIED	.5	.2	.1	.1	*
		PHENOL 8.0%			
7 DAY IMMERSION	1.4	9.3	.2	.4	10.0
7 DAY AIR-DRIED	.6	7.9	.2	.4	7.3
		PHENOL 88.0%			
7 DAY IMMERSION	.7	.5	.7	.3	1.5
7 DAY AIR-DRIED	2.1	1.5	1.0	.8	3.3

ETHYLENE PROPYLENE DIENE MONOMER: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		1 2 DICHLOROETHANE .9%			
7 DAY IMMERSION	3.1	1.7	.8	.8	3.3
7 DAY AIR-DRIED	.2	*	.1	*	.1
		1 2 DICHLOROETHANE .5%			
7 DAY IMMERSION	3.1	.8	.8	.9	2.5
7 DAY AIR-DRIED	.1	.5	*	*	.5
		1 2 DICHLOROETHANE 100.0%			
7 DAY IMMERSION	9.9	7.1	6.7	6.0	18.6
7 DAY AIR-DRIED	22.7	11.8	9.3	8.8	27.1
		FURFURAL 1.0%			
7 DAY IMMERSION	.4	.7	*	*	.7
7 DAY AIR-DRIED	*	.5	.1	.1	.3
		FURFURAL 5.0%			
7 DAY IMMERSION	1.4	1.5	.2	.6	2.3
7 DAY AIR-DRIED	.1	.2	.1	.1	.3
		FURFURAL 8.0%			
7 DAY IMMERSION	1.9	1.5	.4	.5	2.3
7 DAY AIR-DRIED	.1		.2	.2	
		FURFURAL 100.0%			
7 DAY IMMERSION	1.8	1.0	.8	.4	2.1
7 DAY AIR-DRIED	2.8	.7	1.1	.4	2.2
		METHYLETHYL KETONE 1.0%			
7 DAY IMMERSION	.4	.5	.2	.2	.5
7 DAY AIR-DRIED	.1	*	*	.5	.5
		METHYL ETHYL KETONE 10.0%			
7 DAY IMMERSION	1.5	*	*	*	*
7 DAY AIR-DRIED	*	.7	.3	.1	1.1
		METHYL ETHYL KETONE 26.0%			
7 DAY IMMERSION	5.5	2.4	2.2	2.1	6.9
7 DAY AIR-DRIED	.2	1.0	.2	.4	.8

EPICHLOROHYDRIN: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
1 2 DICHLOROETHANE 100.0%					
7 DAY IMMERSION	223.8	62.6	41.0	33.3	205.6
7 DAY AIR-DRIED	1.9	1.3	.7	.4	2.4
FURFURAL 100.0%					
7 DAY IMMERSION	189.0	62.6	48.8	39.4	237.4
7 DAY AIR-DRIED	3.0	1.6	1.0	.8	3.5
METHYL ETHYL KETONE 99.0%					
7 DAY IMMERSION	110.3	44.8	28.1	19.9	122.6
7 DAY AIR-DRIED	3.4	1.6	.9	.8	3.2
PHENOL 88.0%					
7 DAY IMMERSION	176.9	63.5	49.3	39.1	239.7
7 DAY AIR-DRIED	49.1	30.1	18.1	12.9	73.5

HIGH DENSITY POLYETHYLENE: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		1 2 DICHLOROETHANE .9%			
7 DAY IMMERSION	1.6	8.7	.6	.1	8.1
7 DAY AIR-DRIED	*	8.7	*	.7	9.3
		1 2 DICHLOROETHANE .5%			
7 DAY IMMERSION	1.6	4.3	.6	.2	3.6
7 DAY AIR-DRIED	*	6.4	*	.6	7.0
		1 2 DICHLOROETHANE 100.0%			
7 DAY IMMERSION	4.3	1.9	1.7	.8	.6
7 DAY AIR-DRIED	.1	2.2	*	.6	2.8
		FURFURAL 1.0%			
7 DAY IMMERSION	.3	3.4	.1	.4	3.8
7 DAY AIR-DRIED	.2	3.1	.1	.2	3.4
		FURFURAL 5.0%			
7 DAY IMMERSION	1.1	.3	*	.2	.5
7 DAY AIR-DRIED	.3	.3	*	.1	.4
		FURFURAL 8.0%			
7 DAY IMMERSION	.9	3.6	.2	.1	3.7
7 DAY AIR-DRIED	.4	.3	.1	.3	.1
		FURFURAL 100.0%			
7 DAY IMMERSION	.5	*	.2	*	.2
7 DAY AIR-DRIED	.1	*	.1	.1	*
		METHYL ETHYL KETONE 1.0%			
7 DAY IMMERSION	.3	2.2	*	*	2.3
7 DAY AIR-DRIED	*	2.9	*	.3	3.2
		METHYL ETHYL KETONE 10.0%			
7 DAY IMMERSION	.8	2.8	.5	.1	2.3
7 DAY AIR-DRIED	*	1.6	.2	.1	1.3
		METHYL ETHYL KETONE 26.0%			
7 DAY IMMERSION	1.5	.6	1.6	.6	1.6
7 DAY AIR-DRIED	*	.3	.2	*	.1

HIGH DENSITY POLYETHYLENE: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		1 2 DICHLOROETHANE .9%			
7 DAY IMMERSION	1.6	8.7	.6	.1	8.1
7 DAY AIR-DRIED	*	8.7	*	.7	9.3
		1 2 DICHLOROETHANE .5%			
7 DAY IMMERSION	1.6	4.3	.6	.2	3.6
7 DAY AIR-DRIED	*	6.4	*	.6	7.0
		1 2 DICHLOROETHANE 100.0%			
7 DAY IMMERSION	4.3	1.9	1.7	.8	.6
7 DAY AIR-DRIED	.1	2.2	*	.6	2.8
		FURFURAL 1.0%			
7 DAY IMMERSION	.3	3.4	.1	.4	3.8
7 DAY AIR-DRIED	.2	3.1	.1	.2	3.4
		FURFURAL 5.0%			
7 DAY IMMERSION	1.1	.3	*	.2	.5
7 DAY AIR-DRIED	.3	.3	*	.1	.4
		FURFURAL 8.0%			
7 DAY IMMERSION	.9	3.6	.2	.1	3.7
7 DAY AIR-DRIED	.4	.3	.1	.3	.1
		FURFURAL 100.0%			
7 DAY IMMERSION	.5	*	.2	*	.2
7 DAY AIR-DRIED	.1	*	.1	.1	*
		METHYL ETHYL KETONE 1.0%			
7 DAY IMMERSION	.3	2.2	*	*	2.3
7 DAY AIR-DRIED	*	2.9	*	.3	3.2
		METHYL ETHYL KETONE 10.0%			
7 DAY IMMERSION	.8	2.8	.5	.1	2.3
7 DAY AIR-DRIED	*	1.6	.2	.1	1.3
		METHYL ETHYL KETONE 26.0%			
7 DAY IMMERSION	1.5	.6	1.6	.6	1.6
7 DAY AIR-DRIED	*	.3	.2	*	.1

HIGH DENSITY POLYETHYLENE: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		METHYL ETHYL KETONE 99.0%			
7 DAY IMMERSION	1.8	1.3	1.0	.2	.1
7 DAY AIR-DRIED	.1	1.6	*	*	1.6
		ASTM #2 OIL SATURATED			
7 DAY IMMERSION	.5	.7	*	.2	.8
7 DAY AIR-DRIED	.5	1.0	.1	.1	.8
		ASTM #2 OIL 100.0%			
7 DAY IMMERSION	.6	*	*	.1	.1
7 DAY AIR-DRIED	.5	*	.1	.1	.2
		PHENOL 1.0%			
7 DAY IMMERSION	*	1.9	*	.1	1.8
7 DAY AIR-DRIED	*	1.0	*	*	.9
		PHENOL 5.0%			
7 DAY IMMERSION	.5	*	*	.4	.4
7 DAY AIR-DRIED	*	.6	.1	.7	1.5
		PHENOL 8.0%			
7 DAY IMMERSION	.2	1.7	*	.3	1.4
7 DAY AIR-DRIED	.2	.3	.2	.3	.8
		PHENOL 88.0%			
7 DAY IMMERSION	.2	1.3	*	.3	1.6
7 DAY AIR-DRIED	.1	.3	.2	.1	.3

CHLOROSULPHONATED POLYETHYLENE, LOW WATER ABSORPTION: INITIAL SCREENING, RETENTION OF PROPERTIES, 23°C

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT LENGTH CHANGE	PERCENT WIDTH CHANGE	PERCENT VOLUME CHANGE
		1 2 DICHLOROETHANE 100.0%			
7 DAY IMMERSION	105.7	34.6	3.3	9.7	42.8
7 DAY AIR-DRIED	11.7	2.9	10.6	.2	13.4
		FURFURAL 100.0%			
7 DAY IMMERSION	10.1	9.7	2.1	3.7	16.1
7 DAY AIR-DRIED	1.4	.3	.7	.3	1.3
		METHYL ETHYL KETONE 99.0%			
7 DAY IMMERSION	14.0	9.8	.7	3.4	12.6
7 DAY AIR-DRIED	5.9	1.7	4.4	1.3	7.2
		PHENOL 88.0%			
7 DAY IMMERSION	13.2	10.3	2.5	3.9	17.5
7 DAY AIR-DRIED	1.5	*	.8	.3	1.1

APPENDIX C

WEIGHT AND DIMENSION PROCEDURES

SOP #: FML-1
Revision: 2
Date: 3/5/85
Page 1 of 8

INSTRUCTIONS FOR MEASURING FML SAMPLES

. USING THE FEDERAL 691B MICROMETER

Before beginning, make sure the measuring surfaces are clean. (The anvil and presser foot, see illustration.) Zero the micrometer by loosening the knob A and adjusting the dial face, retightening the knob when done. Check the zero by lifting the presser foot slightly a couple of times, using the lever B, and seeing that the dial indicator goes back to zero at rest.

Lift the presser foot with the lever. Insert the sample to be measured under the presser foot. Gently release the lever and lower the foot onto the sample. Lift the foot slightly a couple of times to make sure the reading is stable. Read the dial as shown below and record the reading.

To read the dial: First, the small dial on the lower left portion of the big one is the hundredths of an inch reading. The scale goes from one to ten, or from 0.01 to 0.10 inch. Then read the main dial, from 00 to 99, or from .0000 to .0099 inches. Example, the dial is as shown in the figure: Read the small dial at 3 (use the next lower number from where the needle rests). Read the large dial at 44. This gives you a value of 0.0344 inches, or 34.4 mils. (A mil is one thousandth of an inch.)

For FML samples, measure the thickness at three places along the sample: each end and in the middle. Make sure the end readings are at least 1/4

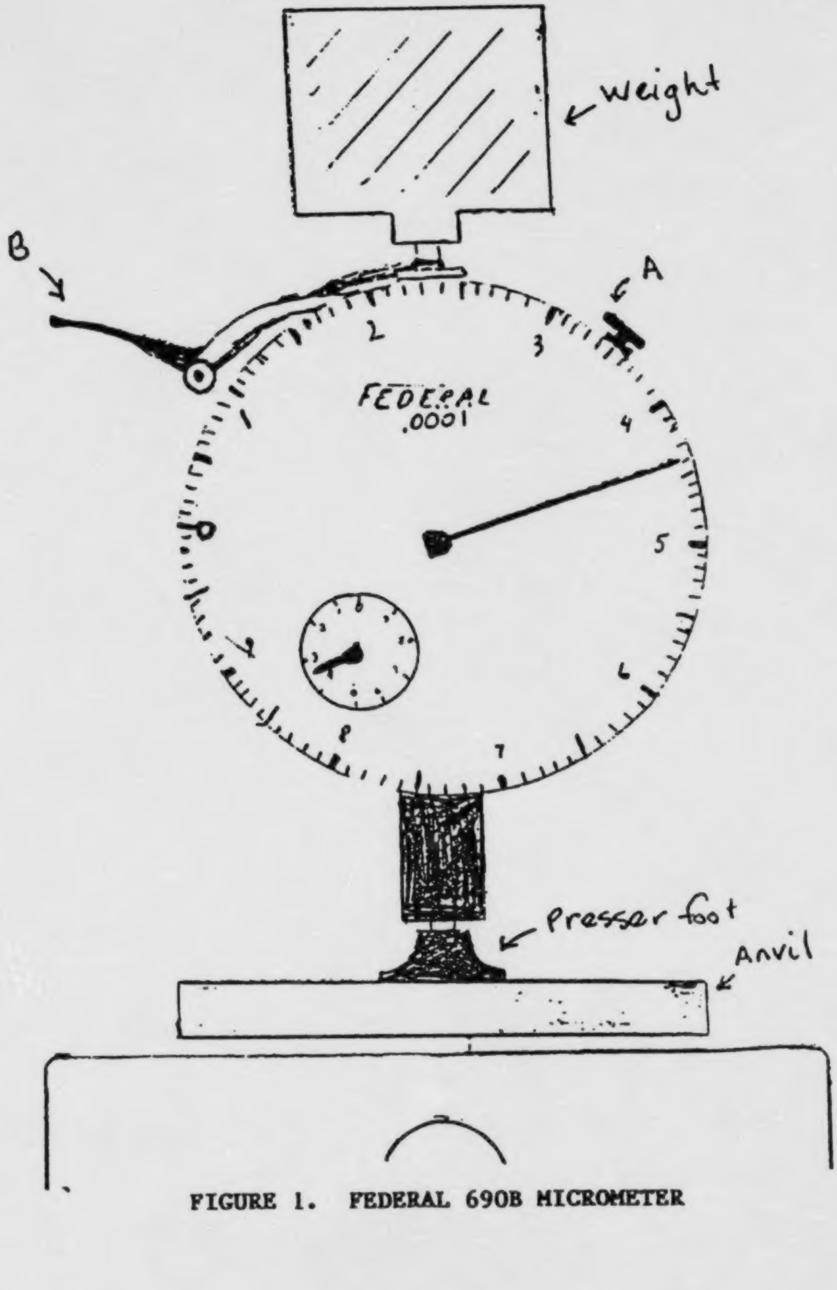

weight
B
A
FEDERAL
.0001
1
2
3
4
5
6
7
8
9
0
Presser foot
Anvil

FIGURE 1. FEDERAL 690B MICROMETER

inch in from the edges of the sample. Record the readings and average them on the data sheet.

To calibrate: use a calibration sheet like the one in Figure 2. Zero the micrometer and then measure the gage blocks 0.0500 and 0.1001 inches. Determine the difference between the measurements and the actual thickness. Average the two values. If the average is more than .5 mil (0.0005 inches), correct your thickness readings on future FML samples by this difference. Report the difference to the lab supervisor.

CALIBRATION RECORD FOR FEDERAL [illegible] DIAL MICROMETER

NICIAN: ______________ DATE: ______________

ON FOR CALIBRATION: SCHEDULED ________ UNSCHEDULED: ________
unscheduled give description of problem)

GAGE BLOCK	READING	DIFFERENCE
NONE	(SET TO ZERO)	
0.0500 INCHES	________	________
0.1001 INCHES	________	________

AVERAGE DIFFERENCE: ________

IF AVERAGE DIFFERENCE IS LESS THAN 0.0005 INCHES, NO CORRECTION IS TO BE APPLIED TO THE READINGS.

IF AVERAGE DIFFERENCE IS MORE THAN 0.0005 INCHES. CORRECT ALL READINGS BY THE AVERAGE DIFFERENCE. REPORT THE DIFFERENCE TO THE LAB SUPERVISOR.

ACTION TAKEN: ______________________________

____

____

FIGURE 2. CALIBRATION SHEET

USING THE CALIPERS

Before measuring the samples, you need to make sure that the calipers are calibrated. This should be done EACH DAY. If in doubt, calibrate them.

To Calibrate: Use the one inch gage block. Measure this block and set the dial on the calipers to read exactly 1.000 inches. This dial is set by loosening the black knob in back of the dial, rotating the dial to be set exactly at the zero mark, and retightening the black dial.

To measure FML Samples: Open the calipers wider than the sample and slowly close them until you just contact the edge of the sample. Be careful not to squeeze and flex the material. You can tell when you have the correct position when the sample will just be caught and moved on both edges, but not lifted all the way up, when the calipers are lifted.

Read the calipers as follows: Read the inches and tenths of inches from the lower scale. For example, 0.9 inches. Then use the dial to read the next two decimal places. NOTE: The dial uses only 1/2 rotation to go from 00 to 100.

For Example: On the calipers in Figure 3, the reading is 0.956 inches.

For FML Samples: Measure the length at two points.

Measure the width at three, at both ends and in the middle.

Average each of these and record.

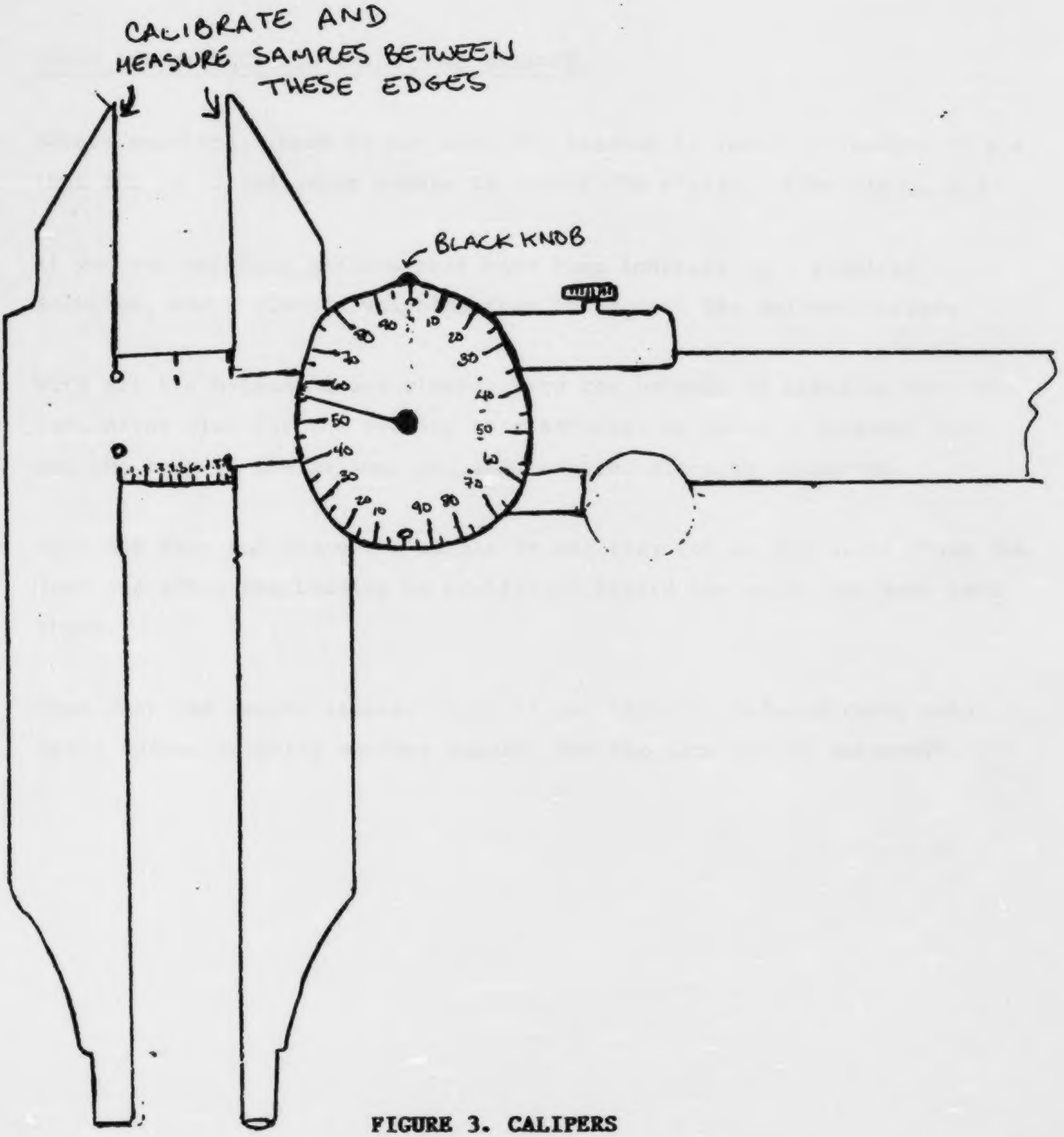

CALIBRATE AND MEASURE SAMPLES BETWEEN THESE EDGES
BLACK KNOB

FIGURE 3. CALIPERS

SOP #: FML-1
Revision: 2
Date: 3/5/85
Page 7 of 8

USING THE METTLER A30 ANALYTICAL BALANCE

Before starting, check to see that the balance is level by looking to see that the level indicator bubble is inside the circle. (See Figure 4.)

If you are weighing samples that have been immersed in a chemical solution, use a plastic weighing tray to protect the balance surface.

With all the balance doors closed, zero the balance by pressing the tare bar. Allow time for the reading to stabilize. If using a weighing tray, put the tray on the balance pan and re-zero. Allow to stabilize.

Open one door and place the sample in the tray (or on the pan). Close the door and allow the reading to stabilize. Record the weight on your data sheet.

Open door and remove sample. Check to see that the balance reads zero again before weighing another sample. Use the tare bar if necessary.

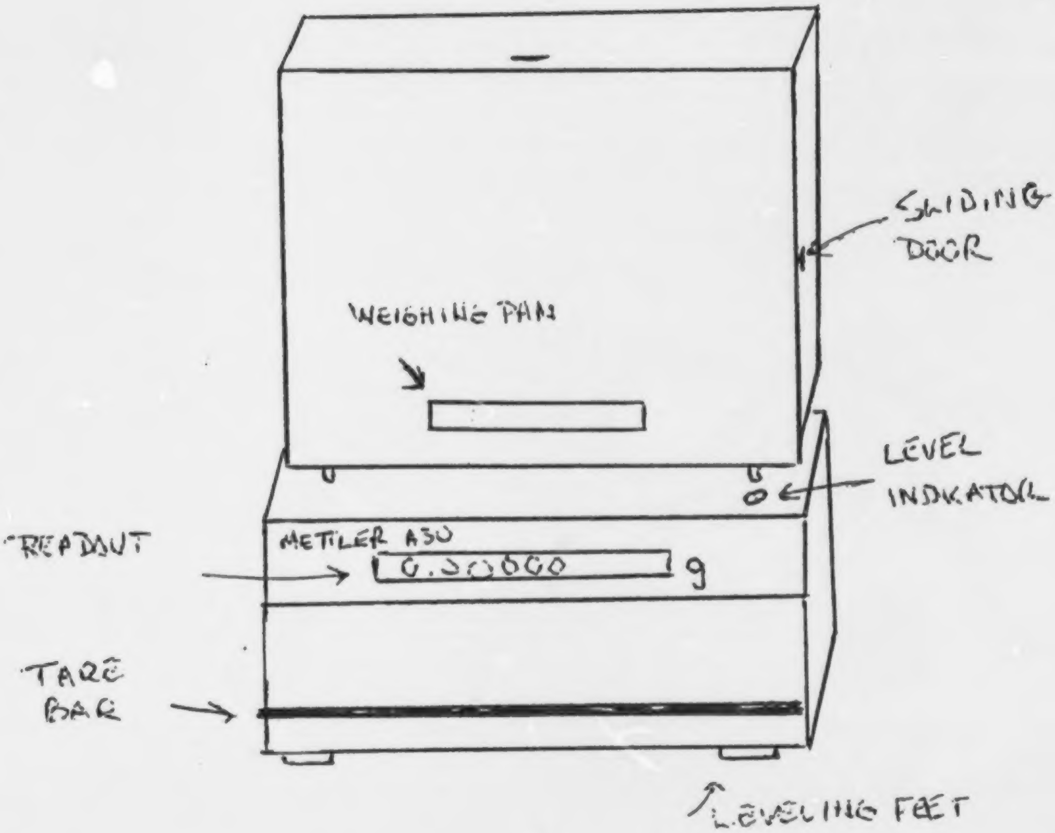

SLIDING DOOR
WEIGHING PAN
LEVEL INDICATOR
READOUT
METTLER A30
0.00000
g
TARE BAR
LEVELING FEET

FIGURE 4. METTLER A30 ANALYTICAL BALANCE

APPENDIX D

PERCENT OF TARGET CONCENTRATION

CHEMICAL CONCENTRATIONS AFTER IMMERSION (WEIGHT PERCENT)

		ELAPSED DAYS	TARGET CONCENTRATION	23°C PERCENT OF TARGET	50°C PERCENT OF TARGET
CPE	NaOH	150	10.0	119.00	100.00
CPE	DCE	*	.5	*	72.00
CPE	DCE	*	.1	*	53.00
CPE	DCE	*	.8	*	73.75
CPE	DCE	7	.8	*	42.50
CPE	DCE	7	.1	*	38.00
CPE	DCE	7	.5	*	50.00
CPE	DCE	56	.5	40.20	20.80
CPE	DCE	56	.1	46.00	4.00
CPE	DCE	56	.8	35.88	24.25
CPE	FURFURAL	14	4.0	*	101.25
CPE	FURFURAL	28	1.0	*	102.00
CPE	FURFURAL	28	4.0	100.00	101.25
CPE	FURFURAL	56	4.0	250.00	100.00
CPE	FURFURAL	56	1.0	*	110.00
CPE	MEK	14	13.0	*	92.31
CPE	MEK	16	13.0	*	15.38
CPE	MEK	28	13.0	61.54	61.54
CPE	MEK	56	13.0	76.92	107.69
CPE	MEK	113	13.0	*	92.31
CPE	MEK	126	13.0	*	107.69
CPE	PHENOL	14	4.0	107.50	110.00
CPE	PHENOL	28	4.0	107.50	105.00
CPE	PHENOL	56	8.0	*	95.00
CPE	PHENOL	56	4.0	*	100.00
CPE	PHENOL	56	1.0	7.60	100.00
EPDM	NaOH	150	10.0	110.00	102.00
EPDM	DCE	*	.1	*	70.00
EPDM	DCE	*	.8	*	50.00
EPDM	DCE	*	.5	*	56.00
EPDM	DCE	7	.8	*	48.75
EPDM	DCE	7	.5	*	60.00
EPDM	DCE	7	.1	*	51.00
EPDM	DCE	56	.8	54.13	45.13
EPDM	DCE	56	.1	41.00	20.00
EPDM	DCE	56	.5	55.00	1.20
EPDM	FURFURAL	14	4.0	4.15	103.75
EPDM	FURFURAL	28	1.0	.94	94.00

CHEMICAL CONCENTRATIONS AFTER IMMERSION (WEIGHT PERCENT)

		ELAPSED DAYS	TARGET CONCENTRATION	23^oC PERCENT OF TARGET	50^oC PERCENT OF TARGET
EPDM	FURFURAL	28	4.0	105.00	103.75
EPDM	FURFURAL	56	4.0	97.50	107.50
EPDM	FURFURAL	56	1.0	*	110.00
EPDM	MEK	7	13.0	69.23	100.00
EPDM	MEK	14	13.0	69.23	53.85
EPDM	MEK	21	13.0	53.85	7.69
EPDM	MEK	56	13.0	46.15	53.85
EPDM	MEK	113	13.0	100.00	100.00
EPDM	MEK	126	13.0	*	84.62
EPDM	PHENOL	*	4.0	107.50	112.50
EPDM	PHENOL	*	8.0	101.25	96.25
EPDM	PHENOL	*	1.0	110.00	110.00
EPDM	PHENOL	14	4.0	115.00	105.00
EPDM	PHENOL	28	4.0	110.00	117.50
EPDM	PHENOL	56	4.0	*	100.00
EPDM	PHENOL	56	1.0	*	100.00
EPDM	PHENOL	56	8.0	*	93.75
HDPE	DCE	*	.1	*	70.00
HDPE	DCE	*	.5	*	86.00
HDPE	DCE	*	.8	*	77.50
HDPE	DCE	7	.5	*	58.00
HDPE	DCE	7	.1	*	54.00
HDPE	DCE	7	.8	*	57.50
HDPE	DCE	28	.8	72.25	80.38
HDPE	DCE	28	.5	61.00	7.80
HDPE	DCE	28	.1	61.00	78.00
HDPE	DCE	56	.1	184.00	32.00
HDPE	DCE	56	.8	78.38	9.00
HDPE	DCE	56	.5	53.60	65.60
HDPE	FURFURAL	14	4.0	*	102.50
HDPE	FURFURAL	28	4.0	102.50	105.00
HDPE	FURFURAL	28	1.0	*	101.00
HDPE	FURFURAL	56	4.0	95.00	107.50
HDPE	MEK	14	13.0	*	23.08
HDPE	MEK	56	13.0	92.31	53.85
HDPE	MEK	113	13.0	*	69.23
HDPE	MEK	126	13.0	*	84.62
HDPE	PHENOL	14	4.0	112.50	115.00
HDPE	PHENOL	28	4.0	110.00	112.50
HDPE	PHENOL	56	1.0	*	100.00
HDPE	PHENOL	56	8.0	*	100.00
HDPE	PHENOL	56	4.0	*	97.50

CHEMICAL CONCENTRATIONS AFTER IMMERSION (WEIGHT PERCENT)

		ELAPSED DAYS	TARGET CONCENTRATION	23°C PERCENT OF TARGET	50°C PERCENT OF TARGET
EPI-CO	DCE	*	.5	*	72.00
EPI-CO	DCE	*	.8	*	67.50
EPI-CO	DCE	*	.1	*	74.00
EPI-CO	DCE	7	.1	*	47.00
EPI-CO	DCE	7	.5	*	34.00
EPI-CO	DCE	7	.8	*	38.75
EPI-CO	DCE	56	.5	33.60	1.60
EPI-CO	DCE	56	.8	52.50	*
EPI-CO	DCE	56	.1	76.00	8.00
EPI-CO	FURFURAL	14	4.0	*	97.50
EPI-CO	FURFURAL	28	1.0	*	103.00
EPI-CO	FURFURAL	28	4.0	92.50	92.50
EPI-CO	FURFURAL	56	1.0	*	110.00
EPI-CO	FURFURAL	56	4.0	98.00	98.25
EPI-CO	MEK	14	13.0	*	61.54
EPI-CO	MEK	56	13.0	*	30.77
EPI-CO	MEK	113	13.0	130.77	84.62
EPI-CO	PHENOL	*	4.0	97.50	92.50
EPI-CO	PHENOL	*	1.0	90.00	100.00
EPI-CO	PHENOL	*	8.0	91.25	101.25
EPI-CO	PHENOL	14	4.0	90.00	100.00
EPI-CO	PHENOL	28	4.0	92.50	92.50
EPI-CO	PHENOL	56	8.0	*	87.50
EPI-CO	PHENOL	56	1.0	*	80.00
EPI-CO	PHENOL	56	4.0	*	85.00
PVC	DCE	*	.8	*	83.75
PVC	DCE	*	.1	*	57.00
PVC	DCE	*	.5	*	82.00
PVC	DCE	7	.8	*	53.75
PVC	DCE	7	.5	*	54.00
PVC	DCE	7	.1	*	22.00
PVC	DCE	56	.8	38.75	2.38
PVC	DCE	56	.5	32.20	30.00
PVC	DCE	56	.1	36.00	190.00
PVC	FURFURAL	14	4.0	*	102.50
PVC	FURFURAL	28	1.0	*	94.00
PVC	FURFURAL	28	4.0	97.50	102.50
PVC	FURFURAL	56	4.0	92.50	93.75
PVC	FURFURAL	56	1.0	*	105.00
PVC	MEK	14	13.0	76.92	23.08

CHEMICAL CONCENTRATIONS AFTER IMMERSION (WEIGHT PERCENT)

		ELAPSED DAYS	TARGET CONCENTRATION	23°C PERCENT OF TARGET	50°C PERCENT OF TARGET
PVC	MEK	19	13.0	*	23.08
PVC	MEK	28	13.0	84.62	100.00
PVC	MEK	28	3.0	100.00	66.67
PVC	MEK	56	13.0	61.54	15.38
PVC	MEK	113	13.0	100.00	76.92
PVC	MEK	126	13.0	*	69.23
PVC	PHENOL	14	4.0	100.00	102.50
PVC	PHENOL	28	4.0	105.00	100.00
PVC	PHENOL	56	4.0	*	92.50
PVC	PHENOL	56	8.0	*	90.00
PVC	PHENOL	56	1.0	*	100.00
CSPE-LW	DCE	*	.8	*	82.50
CSPE-LW	DCE	*	.1	*	63.00
CSPE-LW	DCE	*	.5	*	74.00
CSPE-LW	DCE	7	.5	*	48.00
CSPE-LW	DCE	7	.1	*	43.00
CSPE-LW	DCE	7	.8	*	53.75
CSPE-LW	DCE	28	.5	62.60	53.60
CSPE-LW	DCE	28	.8	58.50	68.50
CSPE-LW	DCE	28	.1	69.00	72.00
CSPE-LW	DCE	56	.1	32.00	3.00
CSPE-LW	DCE	56	.8	43.75	13.88
CSPE-LW	DCE	56	.5	41.00	35.40
CSPE-LW	MEK	91	13.0	84.62	84.62
CSPE-LW	PHENOL	14	4.0	112.50	107.50
CSPE-LW	PHENOL	28	4.0	107.50	100.00
CSPE-LW	PHENOL	56	4.0	*	97.50
CSPE-LW	PHENOL	56	8.0	*	96.25
CSPE-LW	PHENOL	56	1.0	*	100.00
CONTROL	DCE	*	.1	74.00	54.00
CONTROL	DCE	*	.5	50.00	72.00
CONTROL	DCE	*	.8	70.00	77.50
CONTROL	DCE	7	.1	*	46.00
CONTROL	DCE	7	.5	*	28.00
CONTROL	DCE	7	.8	*	73.75
CONTROL	DCE	56	.1	76.00	20.00
CONTROL	DCE	56	.5	64.60	3.40
CONTROL	DCE	56	.8	46.00	17.88
CONTROL	FURFURAL	1	4.0	102.75	101.00
CONTROL	FURFURAL	1	8.0	108.38	106.75
CONTROL	FURFURAL	1	1.0	107.00	95.00
CONTROL	FURFURAL	7	1.0	113.00	100.00

CHEMICAL CONCENTRATIONS AFTER IMMERSION (WEIGHT PERCENT)

		ELAPSED DAYS	TARGET CONCENTRATION	23°C PERCENT OF TARGET	50°C PERCENT OF TARGET
CONTROL	FURFURAL	7	8.0	105.63	101.63
CONTROL	FURFURAL	7	4.0	111.50	102.75
CONTROL	FURFURAL	14	4.0	113.25	102.25
CONTROL	FURFURAL	14	8.0	92.13	92.63
CONTROL	FURFURAL	14	1.0	104.00	95.00
CONTROL	FURFURAL	28	4.0	97.50	90.00
CONTROL	FURFURAL	28	1.0	100.00	110.00
CONTROL	FURFURAL	28	8.0	96.25	92.50
CONTROL	MEK	28	13.0	69.23	69.23
CONTROL	MEK	28	3.0	66.67	66.67
CONTROL	MEK	14	13.0	69.23	53.85
CONTROL	MEK	28	13.0	30.00	107.69
CONTROL	MEK	56	13.0	76.92	38.46
CONTROL	MEK	113	13.0	84.62	30.77
CONTROL	DCE	36	.1	61.00	11.00
CONTROL	DCE	36	.8	58.75	71.25
CONTROL	DCE	36	.5	780.00	76.00
CONTROL	FURFURAL	36	4.0	97.50	102.50
CONTROL	MEK	36	13.0	30.00	92.31
CONTROL	PHENOL	36	4.0	97.50	105.00

APPENDIX E

IMMERSION RESULTS

PVC :   FINAL PROPERTIES

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
HYDROCHLORIC ACID 10.0% 50°C												
PH01AM1 1	1.86	31.80	2.98	1.01	50.50	43.94	88.30	78.42	429.60	433.40	10.38	9.46
PH07AM1 7	1.94	32.40	3.01	1.02	44.02	41.10	84.06	75.25	482.00	465.75	10.74	10.38
PH14AM1 14	1.97	32.40	3.05	1.03	50.34	47.90	88.98	84.42	454.70	469.10	11.30	10.94
PH99AM1 28	2.01	32.80	3.03	1.02	*	*	*	*	*	*	*	*
PH28AM1 29	1.94	33.10	2.96	1.04	55.42	54.74	89.06	82.22	367.60	344.30	12.04	12.21
PH56AM1 56	34.88	33.50	7.72	7.13	51.42	49.34	87.74	81.06	411.10	384.40	10.74	10.62
PH99AM2 144	2.20	34.20	3.13	1.07	*	*	*	*	*	*	*	*
PH99AM3 252	2.35	35.30	3.23	1.10	*	*	*	*	*	*	*	*
PH99AM4 368	2.41	35.50	3.23	1.11	*	*	*	*	*	*	*	*
PH99AM5 511	2.50	35.70	3.26	1.11	*	*	*	*	*	*	*	*
PH99AM6 621	2.53	35.90	3.28	1.12	*	*	*	*	*	*	*	*
PH99AM7 733	2.56	36.30	3.30	1.13	57.80	*	89.30	*	523.00	*	*	*
HYDROCHLORIC ACID 10.0% 23°C												
PL01AM2 1	1.88	31.60	3.00	1.00	47.50	41.74	84.10	80.70	422.30	470.10	10.18	9.86
PL01AM1 1	1.90	31.70	3.00	1.00	45.78	43.26	78.06	77.98	372.40	428.30	10.06	9.70
PL01AM3 1	1.89	31.70	3.00	1.00	46.70	44.78	83.46	81.06	416.90	456.10	9.98	9.90
PL07AM1 7	1.90	31.60	3.01	1.00	42.15	39.20	79.25	76.97	431.38	469.33	10.98	9.82
PL07AM3 7	1.87	31.30	3.00	1.00	42.70	39.00	82.80	78.20	456.88	485.80	11.46	10.42
PL07AM2 7	1.85	31.00	3.00	1.00	42.75	41.60	82.70	76.50	439.88	438.00	10.50	10.90
PL14AM3 14	1.89	31.80	3.01	1.00	48.50	47.30	86.94	84.90	427.30	482.75	11.22	10.86
PL14AM1 14	1.90	32.10	3.00	1.00	49.78	45.38	91.82	81.74	486.00	455.40	11.62	10.74
PL14AM2 14	1.91	32.10	3.01	1.00	49.30	45.20	90.86	84.62	482.10	487.00	11.34	11.46
PL99AM1 28	1.92	31.80	2.99	1.00	*	*	*	*	*	*	*	*
PL28AM1 29	1.89	31.80	3.00	1.00	52.26	47.78	93.10	83.50	433.90	436.50	11.10	9.88
PL28AM2 29	1.87	31.60	3.00	1.01	50.26	48.54	92.02	83.70	464.80	410.10	10.44	10.68
PL28AM3 29	1.89	32.00	3.01	1.00	52.18	47.78	90.86	82.86	425.50	422.40	10.76	9.90
PL56AM1 56	32.53	32.00	7.43	6.91	49.58	44.02	90.70	82.10	431.40	438.10	11.22	11.26
PL56AM3 56	32.80	32.20	7.46	6.92	52.18	46.10	92.74	82.62	430.20	423.60	11.38	10.86
PL56AM2 56	33.15	32.50	7.44	6.93	53.26	44.78	89.18	82.58	392.30	442.30	11.34	10.70
PL99AM2 144	1.94	32.00	3.01	1.01	*	*	*	*	*	*	*	*
PL99AM3 238	1.95	32.10	3.02	1.02	*	*	*	*	*	*	*	*
PL99AM4 368	1.96	32.40	3.02	1.01	*	*	*	*	*	*	*	*
PL99AM5 538	1.98	32.10	3.02	1.01	*	*	*	*	*	*	*	*
PL99AM6 621	1.98	32.30	3.03	1.02	*	*	*	*	*	*	*	*
PL99AM7 735	1.99	32.60	3.04	1.02	47.60	*	89.60	*	581.00	*	*	*
SODIUM HYDROXIDE 10.0% 50°C												
PH01BM1 1	1.89	31.40	3.00	1.00	40.42	46.98	81.06	91.26	512.30	502.90	10.80	11.48
PH07BM1 7	1.71	30.90	2.85	0.97	59.66	64.58	94.30	89.90	483.40	501.70	14.36	14.70
PH14BM1 14	1.66	30.50	2.84	0.96	72.10	71.10	92.58	89.46	402.30	387.80	22.98	21.48
PH28BM1 28	1.60	30.20	2.76	0.94	80.40	79.22	97.20	101.82	284.50	294.40	22.78	23.58
PH99BM1 29	*	32.00	2.76	0.93	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM HYDROXIDE 10.0% 50°C												
PH56BM1 56	1.56	30.90	2.75	0.93	85.02	79.74	110.26	107.14	420.70	400.50	30.99	29.60
PH99BM2 144	1.53	32.90	2.72	0.92	*	*	*	*	*	*	*	*
PH99BM3 252	1.52	29.30	2.70	0.91	*	*	*	*	*	*	*	*
PH99BM4 368	1.51	29.50	2.68	0.91	*	*	*	*	*	*	*	*
PH99BM5 510	1.51	29.10	2.67	0.90	*	*	*	*	*	*	*	*
PH99BM6 622	1.48	35.60	2.67	0.90	*	*	*	*	*	*	*	*
PH99BM7 733	1.47	29.80	2.66	0.90	*	*	122.00	*	9.00	*	*	*
SODIUM HYDROXIDE 10.0% 23°C												
PL01BM3 1	1.88	31.10	2.99	1.00	42.54	39.90	88.50	82.06	507.60	540.20	11.20	11.22
PL01BM1 1	1.89	31.30	3.00	1.00	44.50	45.70	82.54	86.38	501.60	463.70	10.19	10.60
PL01BM2 1	1.88	31.20	2.99	1.00	42.46	40.18	89.46	80.46	525.90	503.20	11.44	11.30
PL07BM3 7	1.86	31.60	2.99	0.99	48.10	46.02	90.22	85.30	492.50	520.40	11.02	10.58
PL07BM2 7	1.90	31.50	2.99	1.00	49.30	45.50	91.66	85.66	500.00	530.70	11.04	10.48
PL07BM1 7	1.88	31.30	2.99	1.00	45.38	40.98	94.10	83.26	578.40	567.40	10.62	10.14
PL14BM2 14	1.90	31.70	2.98	1.00	39.98	37.26	87.46	78.82	537.70	548.60	10.22	9.98
PL14BM1 14	1.87	31.40	2.99	1.00	51.22	44.75	88.82	83.05	425.40	471.75	11.66	10.52
PL14BM3 14	1.90	31.60	2.98	1.00	41.38	36.22	86.22	77.22	505.30	522.00	10.50	9.68
PL28BM2 28	1.85	31.30	2.98	0.99	40.46	49.54	78.98	91.42	480.90	489.80	10.98	11.60
PL99BM1 28	1.89	31.70	2.97	0.99	*	*	*	*	*	*	*	*
PL28BM1 28	1.84	31.30	2.97	0.99	47.54	44.62	88.42	81.38	466.40	494.20	11.50	10.70
PL28BM3 32	1.84	31.10	2.98	0.99	42.02	51.18	79.66	92.10	486.20	475.60	11.32	11.68
PL56BM3 56	1.74	31.10	2.89	0.96	68.02	63.90	96.58	89.38	480.70	469.20	16.50	16.67
PL56BM1 56	1.71	30.50	2.89	0.96	61.42	60.06	92.10	88.34	435.50	488.00	15.13	16.53
PL56BM2 56	1.72	30.90	2.90	0.96	61.22	65.30	89.34	89.50	476.70	444.00	15.90	15.44
PL99BM2 144	1.66	31.10	2.83	0.95	*	*	*	*	*	*	*	*
PL99BM3 238	1.59	30.50	3.00	0.94	*	*	*	*	*	*	*	*
PL99BM4 368	1.58	30.30	2.80	0.93	*	*	*	*	*	*	*	*
PL99BM5 510	1.57	29.20	2.77	0.92	*	*	*	*	*	*	*	*
PL99BM6 622	1.55	31.30	2.77	0.92	*	*	*	*	*	*	*	*
PL99BM7 735	1.55	30.80	2.76	0.92	82.00	*	136.00	*	175.00	*	*	*
1 2 DICHLOROETHANE .8% 50°C												
PH01DH1 1	2.24	33.00	3.06	1.05	21.15	20.31	62.09	61.15	498.58	535.98	6.73	6.07
PH07DH1 7	2.17	33.10	3.07	1.07	22.67	23.40	56.53	61.15	459.20	531.28	8.83	8.06
PH14DH1 14	2.13	33.10	3.04	1.04	28.84	31.23	69.66	67.91	502.09	481.38	6.48	5.99
PH99DH1 28	2.24	32.50	3.02	1.02	*	*	*	*	*	*	*	*
PH28DH1 29	2.19	32.80	3.06	1.05	23.10	22.66	62.73	58.84	506.10	510.25	7.33	6.32
PH56DH1 56	2.00	32.30	2.99	1.02	31.87	29.93	71.39	69.25	466.68	494.28	8.99	8.89
PH99DH2 133	1.98	32.20	2.99	1.01	*	*	*	*	*	*	*	*
PH99DH3 244	2.31	32.70	3.01	1.03	*	*	*	*	*	*	*	*
PH99DH4 364	2.04	32.80	3.01	1.03	*	*	*	*	*	*	*	*
PH99DH5 495	2.07	32.90	3.03	1.03	*	*	*	*	*	*	*	*
PH99DH6 629	1.93	31.70	2.97	1.01	*	*	*	*	*	*	*	*
PH99DH7 726	2.19	33.30	3.06	1.04	32.84	*	64.71	*	492.67	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .8% 23°C												
PL01DH3 1	2.14	32.70	3.05	1.04	26.34	25.23	67.97	66.49	515.15	509.73	6.42	5.93
PL01DH2 1	2.16	32.60	3.05	1.04	19.40	19.81	58.68	60.80	509.80	548.30	6.65	5.95
PL01DH1 1	2.13	32.30	3.04	1.04	25.97	23.58	70.21	66.05	508.15	525.78	7.36	6.75
PL07DH1 7	2.11	32.80	3.04	1.04	19.57	19.18	60.90	59.65	534.48	553.63	9.36	8.70
PL07DH2 7	2.03	32.20	3.03	1.03	26.38	25.52	62.41	65.11	475.15	529.40	7.36	6.59
PL07DH3 7	2.15	32.40	3.03	1.04	20.96	20.30	58.20	59.10	506.60	554.80	7.91	7.27
PL14DH2 14	2.16	32.80	3.04	1.04	34.29	34.75	75.95	76.23	503.35	495.25	6.88	6.98
PL14DH1 14	2.21	32.80	3.08	1.05	28.65	23.66	69.23	62.97	492.53	527.30	6.48	5.74
PL14DH3 14	2.12	32.10	3.02	1.03	31.79	30.06	74.28	69.85	492.15	511.80	7.11	7.84
PL28DH2 28	2.22	32.60	3.11	1.05	*	*	*	*	*	*	7.60	7.46
PL28DH3 28	2.08	32.20	3.04	1.03	*	*	*	*	*	*	7.28	6.36
PL99DH1 28	2.00	31.70	3.04	1.02	*	*	*	*	*	*	*	*
PL28DH1 29	2.16	32.70	3.10	1.05	26.14	22.05	64.52	59.62	494.20	526.28	6.16	5.71
PL56DH1 56	2.07	32.60	3.01	1.03	21.71	20.62	60.71	57.00	485.15	486.00	7.04	6.64
PL56DH2 56	2.13	32.70	3.03	1.03	31.90	30.96	67.33	63.98	462.80	468.38	9.07	8.39
PL56DH3 56	2.15	32.70	3.04	1.04	33.54	29.71	71.00	64.16	480.70	483.55	9.99	9.16
PL99DH2 134	2.09	31.70	3.05	1.02	*	*	*	*	*	*	*	*
PL99DH3 231	2.05	32.10	3.10	1.05	*	*	*	*	*	*	*	*
PL99DH4 364	2.07	32.00	3.07	1.03	*	*	*	*	*	*	*	*
PL99DH5 495	1.99	31.60	3.02	1.01	*	*	*	*	*	*	*	*
PL99DH6 630	2.13	33.00	3.04	1.04	*	*	*	*	*	*	*	*
PL99DH7 728	2.15	32.30	3.06	1.04	25.30	*	68.70	*	715.00	*	*	*
1 2 DICHLOROETHANE .1% 50°C												
PH01DL1 1	1.94	32.20	2.96	1.01	36.24	34.05	78.86	75.82	476.20	504.93	9.63	9.27
PH07DL1 7	1.94	31.80	2.98	1.01	37.88	36.50	81.38	76.49	498.09	506.00	10.04	9.38
PH14DL1 14	1.95	32.10	2.96	1.01	35.88	34.25	78.47	74.89	495.93	511.83	9.23	8.37
PH99DL1 28	1.95	32.20	3.00	1.01	*	*	*	*	*	*	*	*
PH28DL1 29	1.93	31.70	2.97	1.01	34.47	32.32	76.97	72.92	505.85	525.78	9.08	9.23
PH56DL1 56	1.98	32.20	2.98	1.02	30.36	29.97	68.54	67.29	470.50	489.78	8.64	8.64
PH99DL2 139	1.95	31.90	3.00	1.01	*	*	*	*	*	*	*	*
PH99DL3 246	1.97	32.00	3.01	1.01	*	*	*	*	*	*	*	*
PH99DL4 366	1.96	32.10	3.01	1.01	*	*	*	*	*	*	*	*
PH99DL5 496	1.96	31.90	3.00	1.01	*	*	*	*	*	*	*	*
PH99DL6 631	1.96	32.00	3.00	1.01	*	*	*	*	*	*	*	*
PH99DL7 728	1.96	32.10	3.01	1.02	47.80	*	86.70	*	643.00	*	*	*
1 2 DICHLOROETHANE .1% 23°C												
PL01DL3 1	1.93	31.50	2.99	1.01	38.57	35.61	85.10	79.44	516.90	542.15	9.90	9.19
PL01DL2 1	1.92	31.60	2.99	1.01	33.11	30.65	80.65	75.97	519.35	554.48	9.57	8.14
PL01DL1 1	1.91	31.30	3.00	1.01	35.52	32.95	80.98	76.04	488.78	515.58	10.18	8.75
PL07DL1 7	1.95	31.80	3.00	1.01	35.59	31.88	79.78	74.47	494.50	535.75	9.42	8.70
PL07DL2 7	1.94	31.50	3.01	1.01	32.50	29.25	76.95	73.47	523.00	566.00	9.05	8.71
PL07DL3 7	1.97	31.90	3.02	1.01	33.16	30.72	79.95	73.96	530.70	557.70	9.38	8.65

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .1% 23°C												
PL14DL1 14	1.95	31.70	3.00	1.01	33.59	30.50	76.11	74.19	471.83	527.78	8.93	7.77
PL14DL2 14	1.96	31.70	3.00	1.01	33.21	30.47	80.07	73.57	516.38	530.95	9.75	9.26
PL14DL3 14	1.95	31.70	3.00	1.01	32.40	29.12	78.18	71.68	491.33	516.40	8.41	8.60
PL28DL3 28	1.95	31.80	3.00	1.01	*	*	*	*	*	*	10.52	9.58
PL99DL1 28	1.91	31.40	3.00	1.00	*	*	*	*	*	*	*	*
PL28DL2 28	1.93	31.60	3.00	1.01	*	*	*	*	*	*	9.63	9.42
PL28DL1 29	1.95	31.90	3.00	1.01	33.11	31.34	78.44	75.56	503.40	535.45	9.65	8.78
PL56DL2 56	1.92	31.60	3.00	1.00	34.34	31.92	74.23	71.17	467.55	509.08	10.07	9.44
PL56DL3 56	1.93	31.70	3.00	1.01	31.41	31.96	75.41	71.63	527.70	543.08	9.81	8.84
PL56DL1 56	1.97	31.60	3.02	1.02	38.17	35.09	81.14	76.30	457.48	469.03	9.56	9.06
PL99DL2 136	1.93	31.40	3.00	1.00	*	*	*	*	*	*	*	*
PL99DL3 233	1.93	31.50	3.01	1.01	*	*	*	*	*	*	*	*
PL99DL4 366	1.93	31.60	3.00	1.01	*	*	*	*	*	*	*	*
PL99DL5 496	1.91	31.40	3.00	1.01	*	*	*	*	*	*	*	*
PL99DL6 632	1.92	31.50	3.00	1.01	*	*	*	*	*	*	*	*
PL99DL7 730	1.91	31.70	3.00	1.01	44.98	*	86.23	*	588.83	*	*	*
1 2 DICHLOROETHANE .5% 50°C												
PH01DM1 1	2.06	32.20	3.01	1.03	27.14	26.09	68.62	67.18	485.50	515.60	7.69	7.62
PH07DM1 7	2.01	32.00	3.00	1.02	24.87	24.30	65.71	60.55	516.35	495.73	8.43	8.02
PH14DM1 14	2.05	32.60	3.00	1.03	27.48	27.33	66.59	65.19	478.68	493.20	8.80	7.25
PH99DM1 28	2.00	31.90	3.02	1.02	*	*	*	*	*	*	*	*
PH28DM1 29	2.04	32.50	2.99	1.03	28.08	27.06	65.97	63.19	483.63	496.28	7.91	7.41
PH56DM1 56	2.00	32.20	2.97	1.02	32.00	30.53	71.27	69.42	480.13	509.33	9.46	9.09
PH99DM3 245	2.01	31.90	3.02	1.02	*	*	*	*	*	*	*	*
PH99DM4 365	1.95	31.90	3.00	1.02	*	*	*	*	*	*	*	*
PH99DM5 496	1.96	31.90	3.00	1.02	*	*	*	*	*	*	*	*
PH99DM6 630	1.96	32.00	3.00	1.02	*	*	*	*	*	*	*	*
PH99DM7 727	1.97	32.00	3.01	1.02	41.98	*	80.44	*	637.25	*	*	*
1 2 DICHLOROETHANE .5% 23°C												
PL01DM3 1	2.07	32.20	3.04	1.02	26.89	23.94	72.76	66.37	521.80	539.48	6.39	5.94
PL01DM2 1	2.06	32.40	3.03	1.03	28.12	25.23	73.10	68.79	517.15	553.55	7.08	7.39
PL01DM1 1	2.07	32.20	3.04	1.04	29.55	25.09	72.99	69.27	473.23	512.63	7.27	6.49
PL07DM2 7	2.03	32.00	3.04	1.02	26.79	25.31	70.84	62.46	505.80	495.83	7.93	7.59
PL07DM3 7	1.98	31.80	3.01	1.02	30.00	28.10	72.47	70.10	502.20	552.60	8.95	8.13
PL07DM1 7	2.06	32.20	3.03	1.03	22.55	21.95	62.04	62.36	500.23	542.88	8.64	8.00
PL14DM3 14	2.00	32.00	3.03	1.02	26.62	27.12	70.86	72.42	507.68	556.70	9.14	8.72
PL14DM2 14	2.05	32.10	3.03	1.03	24.37	22.11	69.55	64.12	532.25	548.08	7.95	7.77
PL14DM1 14	2.06	32.60	3.05	1.04	28.55	24.54	71.14	65.84	503.13	520.73	7.02	6.32
PL99DM1 28	2.06	32.40	3.05	1.02	*	*	*	*	*	*	*	*
PL28DM2 28	2.08	32.50	3.04	1.03	*	*	*	*	*	*	8.32	7.54
PL28DM3 28	2.05	32.00	3.03	1.03	*	*	*	*	*	*	7.28	7.13
PL28DM1 29	2.05	32.00	3.06	1.04	24.55	23.36	63.61	62.89	493.55	533.15	7.42	6.77

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .5% 23°C												
PL56DM1 56	1.93	31.80	3.00	1.01	29.71	26.75	70.23	67.91	455.13	497.83	8.45	7.79
PL56DM3 56	2.07	32.50	3.02	1.02	32.33	30.24	71.99	68.14	487.23	502.98	9.14	8.25
PL56DM2 56	2.00	32.20	3.00	1.02	32.04	31.48	71.46	68.78	486.08	505.73	9.80	8.86
PL99DM2 135	1.99	32.10	3.02	1.01	*	*	*	*	*	*	*	*
PL99DM3 233	2.05	32.60	3.06	1.03	*	*	*	*	*	*	*	*
PL99DM4 365	1.97	32.30	3.01	1.01	*	*	*	*	*	*	*	*
PL99DM5 496	2.03	32.40	3.03	1.02	*	*	*	*	*	*	*	*
PL99DM6 631	2.05	32.50	3.03	1.02	*	*	*	*	*	*	*	*
PL99DM7 729	2.12	33.00	3.07	1.03	28.78	*	73.29	*	675.58	*	*	*
FURFURAL 8.0% 50°C												
PH01FH1 1	1.96	31.90	2.98	1.02	17.60	15.90	38.66	37.58	481.00	523.00	5.62	6.19
PH07FH1 7	3.07	37.40	3.35	1.21	3.92	4.56	19.30	17.84	511.20	489.60	2.35	1.91
PH14FH1 14	2.64	35.10	3.24	1.15	6.30	5.60	24.62	22.63	567.50	564.00	2.64	2.52
PH28FH1 28	2.79	36.60	3.21	1.17	5.10	4.50	23.34	20.82	635.00	615.00	2.39	2.14
PH99FH1 28	2.85	36.30	3.30	1.15	*	*	*	*	*	*	*	*
PH56FH1 56	2.79	35.90	3.29	1.17	6.43	5.02	23.83	21.08	560.00	489.00	2.14	2.14
PH99FH2 117	2.75	36.50	3.29	1.15	*	*	*	*	*	*	*	*
PH99FH3 236	3.34	37.50	3.45	1.20	*	*	*	*	*	*	*	*
PH99FH4 350	3.31	38.60	3.49	1.23	*	*	*	*	*	*	*	*
PH99FH5 485	3.05	38.10	3.44	1.20	*	*	*	*	*	*	*	*
PH99FH6 616	3.41	39.70	3.53	1.24	*	*	*	*	*	*	*	*
PH99FH7 713	3.57	39.80	3.63	1.26	11.98	*	30.03	*	468.25	*	*	*
FURFURAL 8.0% 23°C												
PL01FH3 1	2.35	34.90	3.28	1.14	5.41	5.44	22.45	18.91	557.90	532.10	3.41	3.18
PL01FH2 1	2.44	35.40	3.30	1.14	5.63	5.14	19.32	18.36	525.30	561.20	2.96	3.06
PL01FH1 1	1.92	31.40	3.02	1.01	38.40	36.80	79.70	77.30	465.00	509.00	6.44	6.96
PL07FH2 7	2.68	35.20	3.30	1.15	6.44	6.68	20.56	19.96	458.40	798.40	2.49	2.38
PL07FH3 7	2.69	35.30	3.32	1.14	6.54	7.26	23.02	23.10	528.00	562.40	2.73	2.53
PL07FH1 7	2.75	36.00	3.39	1.15	6.36	6.36	21.00	21.06	494.40	560.00	2.63	2.40
PL14FH1 14	2.64	35.00	3.26	1.13	7.00	4.80	20.80	18.45	497.00	538.00	2.36	2.27
PL14FH3 14	2.65	35.40	3.26	1.14	6.30	6.50	21.22	21.40	505.00	569.00	2.22	2.32
PL14FH2 14	2.74	36.20	3.29	1.15	6.30	6.40	20.76	18.04	515.00	488.00	2.32	2.08
PL28FH1 28	2.87	36.30	3.29	1.16	6.00	5.40	22.24	19.42	619.00	597.00	2.45	2.39
PL28FH3 28	2.90	36.20	3.35	1.07	5.70	5.40	20.72	19.26	519.00	568.00	2.08	2.46
PL99FH1 28	2.88	35.80	3.33	1.15	*	*	*	*	*	*	*	*
PL28FH2 28	2.00	36.10	3.34	1.17	5.00	5.00	21.02	20.08	496.00	601.00	2.34	2.40
PL56FH1 56	2.80	35.90	3.30	1.15	4.94	5.66	19.30	18.72	632.00	603.00	2.37	2.40
PL56FH2 56	3.01	36.90	3.36	1.18	5.60	5.20	21.24	18.40	536.00	526.30	2.27	2.15
PL56FH3 56	2.93	36.10	3.37	1.18	5.56	5.34	21.28	19.52	554.00	565.00	2.16	2.15
PL99FH2 117	2.95	39.40	3.40	1.18	*	*	*	*	*	*	*	*
PL99FH3 219	2.89	36.60	3.45	1.20	*	*	*	*	*	*	*	*
PL99FH4 350	3.22	37.40	3.50	1.21	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 8.0% 23°C												
PL99FH5 485	2.90	36.80	3.41	1.19	*	*	*	*	*	*	*	*
PL99FH6 617	3.66	39.50	3.64	1.27	*	*	*	*	*	*	*	*
PL99FH7 715	3.68	39.40	3.66	1.28	6.80	*	21.60	*	517.17	*	*	*
FURFURAL 1.0% 50°C												
PH01FL1 1	1.96	31.80	2.98	1.02	32.82	30.26	74.74	71.58	466.80	494.70	10.48	8.96
PH07FL1 7	1.97	32.00	2.97	1.02	24.60	24.10	69.90	65.50	570.50	578.00	8.53	8.02
PH14FL1 14	1.96	31.70	3.00	1.02	32.40	30.40	76.00	68.50	490.40	484.00	8.86	8.07
PH28FL1 28	1.96	31.70	2.99	1.02	31.90	30.50	70.38	70.92	475.00	543.00	9.24	9.02
PH99FL1 28	2.01	32.60	3.02	1.01	*	*	*	*	*	*	*	*
PH56FL1 56	1.97	31.80	3.00	1.02	33.20	31.06	75.58	71.32	530.00	545.00	9.97	8.78
PH99FL2 123	2.01	32.50	3.03	1.02	*	*	*	*	*	*	*	*
PH99FL3 241	2.06	32.70	3.04	1.02	*	*	*	*	*	*	*	*
PH99FL4 355	2.06	32.40	3.04	1.03	*	*	*	*	*	*	*	*
PH99FL5 488	2.05	32.80	3.03	1.02	*	*	*	*	*	*	*	*
PH99FL6 621	2.06	31.80	3.04	1.03	*	*	*	*	*	*	*	*
PH99FL7 718	2.05	32.90	3.04	1.03	39.74	*	79.18	*	578.00	*	*	*
FURFURAL 1.0% 23°C												
PL01FL2 1	1.91	31.30	3.01	1.01	35.64	39.05	73.05	78.75	454.00	434.00	10.37	12.84
PL01FL3 1	1.91	31.20	3.01	1.00	34.46	37.85	72.02	77.90	454.40	418.50	10.57	12.52
PL01FL1 1	1.92	31.20	3.01	1.00	37.58	33.90	76.74	75.22	434.00	495.30	11.75	12.92
PL07FL2 7	1.97	31.70	3.01	1.02	24.20	21.70	74.40	70.22	570.00	601.00	8.73	8.24
PL07FL3 7	1.95	31.70	3.01	1.01	21.60	20.60	67.94	64.10	560.00	577.00	8.31	6.91
PL07FL1 7	1.93	31.20	3.02	1.01	23.30	20.00	71.10	64.56	559.00	585.00	8.44	7.54
PL14FL3 14	1.95	31.60	3.01	1.01	28.40	27.60	76.20	72.90	520.00	557.50	9.57	8.64
PL14FL2 14	1.96	31.60	3.01	1.01	27.20	26.90	76.66	74.50	600.00	637.00	9.21	8.45
PL14FL1 14	1.96	31.60	3.01	1.02	28.30	27.60	76.10	73.16	512.80	536.00	9.34	8.10
PL28FL2 28	1.97	31.80	3.01	1.01	31.63	30.60	79.33	76.26	541.30	560.00	9.60	9.14
PL28FL3 28	1.96	31.70	3.01	1.01	30.70	28.20	75.06	71.98	507.00	541.00	9.54	8.54
PL99FL1 28	1.95	31.70	3.01	1.00	*	*	*	*	*	*	*	*
PL28FL1 28	1.94	31.40	3.01	1.01	31.13	28.40	74.46	71.88	550.00	603.00	8.87	8.67
PL56FL3 56	1.97	32.10	3.00	1.02	29.70	27.68	76.28	71.74	537.00	580.00	8.31	7.96
PL56FL2 56	1.95	31.60	3.00	1.01	31.70	30.56	78.76	75.36	543.00	575.00	9.07	8.44
PL56FL1 56	1.95	31.50	3.02	1.02	31.04	27.58	71.98	70.78	504.00	565.00	9.11	8.35
PL99FL2 123	1.95	31.70	3.02	1.01	*	*	*	*	*	*	*	*
PL99FL3 224	1.98	31.90	3.03	1.02	*	*	*	*	*	*	*	*
PL99FL4 355	2.00	32.00	3.05	1.02	*	*	*	*	*	*	*	*
PL99FL5 488	1.99	31.90	3.03	1.01	*	*	*	*	*	*	*	*
PL99FL6 622	2.00	31.80	3.02	1.02	*	*	*	*	*	*	*	*
PL99FL7 720	1.99	32.10	3.04	1.02	33.69	*	74.22	*	631.58	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 4.0% 50°C												
PH01FM1 1	2.17	32.80	3.00	1.06	15.54	14.58	40.78	36.42	442.00	430.30	3.39	3.43
PH07FM1 7	2.16	32.80	3.08	1.05	16.00	15.40	45.10	47.70	478.00	551.00	6.42	5.53
PH14FM1 14	2.16	32.70	3.09	1.06	15.00	14.10	44.66	43.24	492.00	523.20	5.60	5.23
PH28FM1 28	2.18	32.90	3.09	1.05	14.38	14.70	45.30	47.72	530.00	561.00	4.95	5.04
PH99FM1 28	2.18	33.10	3.07	1.05	*	*	*	*	*	*	*	*
PH56FM1 56	2.18	32.80	3.08	1.06	17.50	16.44	50.30	48.86	584.00	539.00	5.74	5.16
PH99FM2 123	2.17	33.10	3.07	1.05	*	*	*	*	*	*	*	*
PH99FM3 241	2.32	33.70	3.13	1.07	*	*	*	*	*	*	*	*
PH99FM4 355	2.30	33.80	3.14	1.08	*	*	*	*	*	*	*	*
PH99FM5 489	2.25	33.60	3.09	1.06	*	*	*	*	*	*	*	*
PH99FM6 621	2.32	34.20	3.11	1.06	*	*	*	*	*	*	*	*
PH99FM7 718	2.28	34.00	3.12	1.07	22.34	*	49.53	*	449.08	*	*	*
FURFURAL 4.0% 23°C												
PL01FM1 1	2.14	32.50	*	1.04	14.58	13.34	41.62	37.82	444.10	457.80	6.50	7.77
PL01FM3 1	1.99	32.00	3.08	1.04	14.33	13.37	48.47	43.74	531.30	528.50	6.94	7.01
PL01FM2 1	2.00	32.20	3.09	1.04	13.27	12.70	46.79	44.06	542.70	548.20	6.96	5.96
PL07FM1 7	2.15	32.70	3.09	1.05	14.30	14.40	46.30	47.50	538.00	597.00	6.32	5.48
PL07FM2 7	2.15	32.60	3.09	1.05	17.30	16.26	49.34	46.56	464.80	505.60	5.79	5.40
PL07FM3 7	2.14	32.50	3.08	1.05	18.94	17.60	56.70	48.86	502.40	476.80	6.84	6.13
PL14FM1 14	2.19	33.10	3.11	1.06	14.88	13.30	45.96	41.36	508.00	514.40	5.26	5.32
PL14FM2 14	2.13	32.30	3.09	1.05	15.70	14.80	48.84	45.08	525.00	539.00	5.15	4.66
PL14FM3 14	2.15	33.00	3.09	1.04	16.20	14.60	48.65	45.64	512.50	525.00	5.23	4.70
PL28FM1 28	2.19	33.10	3.07	1.05	15.08	13.26	44.86	42.46	541.00	569.00	4.61	4.55
PL99FM1 28	2.17	33.00	3.08	1.04	*	*	*	*	*	*	*	*
PL28FM3 28	2.14	32.50	3.06	1.04	14.80	13.60	45.18	45.38	532.00	607.00	4.78	4.50
PL28FM2 28	2.15	32.50	3.07	1.05	13.10	13.20	45.90	45.52	588.00	654.00	4.74	4.42
PL56FM2 56	2.16	32.60	3.09	1.05	15.68	14.80	46.46	43.56	562.00	556.00	5.03	4.62
PL56FM3 56	2.15	32.60	3.08	1.05	15.96	15.46	47.10	49.76	535.00	603.00	5.06	4.72
PL56FM1 56	2.17	32.70	3.08	1.05	16.20	12.84	46.20	44.20	528.00	659.00	4.85	4.54
PL99FM2 123	2.12	32.80	3.07	1.04	*	*	*	*	*	*	*	*
PL99FM3 227	2.23	33.30	3.13	1.07	*	*	*	*	*	*	*	*
PL99FM4 355	2.28	33.50	3.15	1.07	*	*	*	*	*	*	*	*
PL99FM5 489	2.27	33.40	3.12	1.06	*	*	*	*	*	*	*	*
PL99FM6 622	2.27	33.60	3.02	1.01	*	*	*	*	*	*	*	*
PL99FM7 720	2.26	33.60	3.13	1.06	17.30	*	43.99	*	551.67	*	*	*
METHYL ETHYL KETONE 26.0% 50°C												
PH01MH1 1	2.65	38.20	3.26	1.20	4.02	3.66	21.50	20.70	556.40	589.80	2.34	2.58
PH07MH1 7	2.59	38.00	2.98	1.18	3.50	3.34	14.75	17.18	470.63	530.80	8.07	7.84
PH14MH1 14	2.91	41.80	3.27	1.37	17.63	14.63	53.39	48.05	545.50	533.50	7.00	6.53
PH28MH1 28	2.51	38.90	2.91	1.19	1.24	1.30	8.34	8.15	469.40	450.80	1.02	1.25
PH99MH1 29	1.71	31.90	2.60	1.00	*	*	*	*	*	*	*	*
PH56MH1 56	2.77	39.40	3.11	1.21	2.67	2.24	14.41	12.49	456.40	429.10	2.24	2.28

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				METHYL ETHYL KETONE 26.0% 50°C								
PH99MH2 122	1.67	31.30	2.54	0.98	*	*	*	*	*	*	*	*
PH99MH3 240	1.92	31.40	2.52	0.97	*	*	*	*	*	*	*	*
PH99MH4 358	1.92	33.60	2.67	1.04	*	*	*	*	*	*	*	*
PH99MH5 494	1.52	30.70	2.43	0.94	*	*	*	*	*	*	*	*
PH99MH6 626	1.78	32.00	2.51	0.98	*	*	*	*	*	*	*	*
PH99MH7 722	1.71	31.90	2.49	0.96	*	*	115.30	*	35.60	*	*	*
				METHYL ETHYL KETONE 26.0% 23°C								
PL01MH1 1	2.29	35.10	3.21	1.11	10.22	8.70	35.20	32.78	542.10	618.40	3.62	3.86
PL01MH3 1	4.41	43.20	3.80	1.39	0.10	1.03	0.30	3.48	70.00	189.00	1.10	0.98
PL01MH2 1	3.53	39.80	3.01	1.30	1.90	1.50	12.78	7.98	495.00	380.70	1.70	1.42
PL07MH2 7	2.63	41.00	3.26	1.23	1.66	1.46	8.34	7.78	365.20	377.90	2.45	2.27
PL07MH1 7	3.16	40.70	3.43	1.31	2.82	2.18	12.18	13.22	410.00	523.80	4.10	2.52
PL07MH3 7	3.35	41.70	3.55	1.35	2.02	2.18	12.34	11.38	496.40	464.50	3.39	3.64
PL14MH2 14	2.91	40.40	3.33	1.26	3.48	2.68	21.16	20.78	546.40	637.20	2.59	2.37
PL14MH1 14	3.05	39.70	3.51	1.27	4.13	5.49	22.91	24.22	534.88	558.38	2.28	2.80
PL14MH3 14	2.89	40.70	3.36	1.30	4.30	4.55	26.20	25.11	595.50	570.20	2.27	2.47
PL28MH3 28	2.83	40.50	3.26	1.23	1.57	1.17	6.69	7.21	325.00	392.00	1.12	1.53
PL99MH1 28	2.65	37.10	3.18	1.16	*	*	*	*	*	*	*	*
PL28MH2 28	3.18	41.50	3.45	1.29	1.67	1.23	5.94	6.32	274.90	324.20	1.15	0.99
PL28MH1 28	3.00	40.20	3.33	1.29	1.67	1.25	5.32	4.52	261.60	262.20	1.12	0.86
PL56MH2 56	3.00	39.20	3.40	1.23	4.43	3.15	21.19	18.36	556.83	543.60	2.31	2.11
PL56MH1 56	2.72	37.20	3.22	1.18	3.92	3.10	18.89	16.53	480.90	472.70	2.03	2.15
PL56MH3 56	3.29	39.20	3.51	1.27	2.66	1.98	6.23	7.99	208.40	322.20	1.48	1.45
PL99MH2 121	2.33	35.40	2.90	1.07	*	*	*	*	*	*	*	*
PL99MH3 235	2.06	36.00	3.13	1.14	*	*	*	*	*	*	*	*
PL99MH4 358	3.04	37.40	3.22	1.22	*	*	*	*	*	*	*	*
PL99MH5 494	3.67	39.40	3.42	1.25	*	*	*	*	*	*	*	*
PL99MH6 627	2.91	34.40	2.89	1.09	*	*	*	*	*	*	*	*
PL99MH7 724	2.70	36.60	3.12	1.13	2.79	*	17.90	*	643.60	*	*	*
				METHYL ETHYL KETONE 3.0% 50°C								
PH01ML1 1	1.97	32.50	2.98	1.02	26.86	24.38	68.22	65.66	486.80	539.00	8.38	8.74
PH07ML1 7	2.03	32.40	3.01	1.05	21.00	20.01	55.13	51.12	490.90	487.70	7.88	6.97
PH14ML1 14	1.99	32.40	3.00	1.02	28.01	26.21	60.06	58.72	438.80	477.20	9.72	8.79
PH28ML1 28	2.01	32.80	2.99	1.03	31.99	28.15	65.08	60.18	429.80	457.70	10.39	9.45
PH99ML1 28	2.02	32.60	3.02	1.02	*	*	*	*	*	*	*	*
PH56ML1 56	1.96	32.20	2.98	1.02	33.48	31.93	70.96	66.63	471.80	475.40	10.16	9.73
PH99ML2 120	2.13	33.70	2.97	1.05	*	*	*	*	*	*	*	*
PH99ML3 240	2.15	33.80	2.98	1.06	*	*	*	*	*	*	*	*
PH99ML4 358	2.17	33.90	2.99	1.06	*	*	*	*	*	*	*	*
PH99ML5 493	2.12	33.80	2.97	1.05	*	*	*	*	*	*	*	*
PH99ML6 626	2.13	33.80	2.97	1.05	*	*	*	*	*	*	*	*
PH99ML7 722	2.14	34.00	2.98	1.06	28.58	*	74.55	*	678.92	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 3.0% 23°C													
PL01ML3	1	1.93	31.40	3.03	1.01	24.54	21.62	71.22	61.26	575.40	518.60	10.86	9.70
PL01ML2	1	1.98	31.80	3.04	1.02	25.40	24.90	70.70	66.90	567.13	577.70	9.70	10.18
PL01ML1	1	1.96	31.60	3.04	1.02	23.34	20.82	66.66	63.42	536.80	580.60	7.90	8.14
PL07ML3	7	1.99	32.10	3.03	1.02	29.22	27.43	71.58	65.66	462.58	510.50	10.89	9.47
PL07ML1	7	1.99	32.00	3.03	1.02	24.65	21.75	63.50	59.15	466.50	502.60	9.47	8.24
PL07ML2	7	2.00	32.10	3.03	1.02	29.90	26.26	69.60	67.67	458.80	602.50	10.42	9.61
PL14ML1	14	1.98	32.30	3.02	1.02	19.83	18.35	53.23	52.75	483.80	552.70	7.76	7.33
PL14ML2	14	1.94	31.70	3.03	1.02	16.64	13.38	49.29	41.87	515.00	538.10	5.36	4.30
PL14ML3	14	1.96	31.90	3.03	1.02	18.64	17.11	54.99	49.55	547.10	553.90	7.86	7.45
PL28ML3	28	1.97	32.30	3.02	1.01	38.16	34.79	79.27	73.70	473.60	514.70	9.67	9.53
PL28ML2	28	1.96	32.00	3.00	1.01	33.96	32.67	73.22	72.77	478.90	497.70	10.55	10.12
PL28ML1	28	1.98	32.20	3.02	1.02	29.16	28.84	68.57	66.49	476.90	512.70	9.29	8.48
PL99ML1	28	2.00	32.50	3.03	1.01	*	*	*	*	*	*	*	*
PL56ML1	56	1.97	32.20	3.00	1.02	32.45	29.16	72.41	70.10	476.60	552.30	9.49	9.19
PL56ML2	56	1.93	31.80	3.03	1.02	29.50	27.70	68.88	64.91	491.70	509.70	9.74	8.55
PL56ML3	56	1.94	32.30	3.04	1.03	27.86	24.89	65.79	64.01	470.00	528.30	9.37	8.26
PL99ML2	120	2.02	32.40	3.04	1.02	*	*	*	*	*	*	*	*
PL99ML3	235	2.02	32.60	3.05	1.03	*	*	*	*	*	*	*	*
PL99ML4	358	2.04	32.60	3.05	1.02	*	*	*	*	*	*	*	*
PL99ML5	494	1.99	32.30	3.02	1.01	*	*	*	*	*	*	*	*
PL99ML6	627	2.02	32.40	3.03	1.02	*	*	*	*	*	*	*	*
PL99ML7	724	2.03	32.70	3.04	1.02	30.93	*	77.10	*	636.92	*	*	*
METHYL ETHYL KETONE 13.0% 50°C													
PH01MM1	1	2.23	35.50	3.07	1.11	7.06	6.10	30.46	28.86	555.40	595.70	3.18	3.46
PH07MM1	7	2.65	37.40	3.20	1.20	8.24	7.65	30.32	30.51	443.00	480.40	5.33	5.43
PH14MM1	14	2.09	34.00	2.95	1.06	12.78	13.85	42.83	47.81	518.00	532.50	7.09	7.72
PH99MM1	28	2.31	34.70	3.21	1.08	*	*	*	*	*	*	*	*
PH28MM1	28	2.59	37.10	3.17	1.17	6.49	5.73	26.20	22.89	486.70	453.70	2.16	2.22
PH56MM1	56	1.95	34.60	2.87	1.03	24.14	23.16	67.26	60.84	549.70	507.20	7.56	6.97
PH99MM2	120	2.44	35.30	3.12	1.13	*	*	*	*	*	*	*	*
PH99MM3	239	2.54	35.00	3.10	1.12	*	*	*	*	*	*	*	*
PH99MM4	357	2.46	35.50	3.15	1.14	*	*	*	*	*	*	*	*
PH99MM5	493	2.64	36.10	3.17	1.15	*	*	*	*	*	*	*	*
PH99MM6	625	2.57	36.00	3.10	1.12	*	*	*	*	*	*	*	*
PH99MM7	721	2.57	35.00	3.17	1.16	12.11	*	59.18	*	731.83	*	*	*
METHYL ETHYL KETONE 13.0% 23°C													
PL01MM2	1	2.31	34.30	3.16	1.19	8.58	8.10	32.82	30.62	590.10	624.90	5.78	5.30
PL01MM3	1	2.29	34.20	3.17	1.09	8.06	8.06	31.54	33.18	632.80	635.30	4.78	5.10
PL01MM1	1	2.21	34.10	3.16	1.07	10.30	10.06	34.26	35.02	528.40	587.00	3.98	3.54
PL07MM2	7	2.25	34.70	3.08	1.11	18.69	18.13	56.87	54.45	504.90	499.80	7.55	7.35
PL07MM3	7	2.34	34.80	3.20	1.11	8.78	11.34	*	36.02	559.60	521.90	6.11	5.82
PL07MM1	7	2.30	34.60	3.17	1.10	11.18	10.18	39.74	36.66	558.60	582.60	6.97	6.49

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 13.0% 23°C												
PL14MM1 14	2.27	34.40	3.16	1.09	11.08	11.41	34.17	37.53	508.10	582.70	5.50	5.07
PL14MM2 14	2.19	34.10	3.14	1.08	11.61	12.19	37.77	40.07	541.80	578.10	5.22	5.89
PL14MM3 14	2.21	34.30	3.13	1.08	13.94	13.80	44.90	42.91	551.60	562.70	5.77	5.72
PL28MM2 28	2.08	34.20	2.98	1.05	13.19	11.70	38.06	34.34	465.50	490.60	4.07	3.80
PL28MM3 28	2.19	34.30	3.09	1.08	13.66	12.75	39.49	34.35	472.40	443.60	4.23	3.67
PL28MM1 28	2.20	34.50	3.10	1.08	13.64	11.61	39.28	37.24	469.42	532.25	3.99	3.70
PL99MM1 28	2.21	33.60	3.13	1.07	*	*	*	*	*	*	*	*
PL56MM2 56	2.04	32.50	3.02	1.03	28.73	24.67	65.47	58.23	461.20	471.00	6.07	5.89
PL56MM3 56	2.07	33.20	3.04	1.05	22.15	19.49	58.45	49.70	481.50	474.10	5.95	5.41
PL56MM1 56	2.15	33.40	3.07	1.05	17.25	16.05	47.24	43.60	467.10	485.30	5.13	5.33
PL99MM2 120	2.29	33.60	3.15	1.08	*	*	*	*	*	*	*	*
PL99MM3 234	2.15	34.10	3.19	1.09	*	*	*	*	*	*	*	*
PL99MM4 357	2.27	33.80	3.18	1.08	*	*	*	*	*	*	*	*
PL99MM5 493	2.34	34.10	3.18	1.09	*	*	*	*	*	*	*	*
PL99MM6 626	2.30	32.40	3.01	1.03	*	*	*	*	*	*	*	*
PL99MM7 723	2.28	34.00	3.16	1.09	10.38	*	41.53	*	739.08	*	*	*
ASTM #2 OIL SATURATED 50°C												
PH010M1 1	1.90	31.50	2.98	1.01	42.18	39.66	85.22	77.26	538.00	537.00	13.34	12.90
PH070M1 7	1.92	31.90	2.95	1.01	43.70	39.98	76.22	76.46	416.50	540.60	11.66	10.82
PH140M1 14	1.97	32.40	3.00	1.01	43.40	42.02	81.58	77.86	499.70	522.90	14.42	14.02
PH990M1 28	2.02	33.00	3.05	1.03	*	*	*	*	*	*	*	*
PH280M1 28	1.94	31.90	2.98	1.01	42.70	40.10	81.78	79.50	503.00	556.70	10.80	10.30
PH560M1 56	1.92	31.70	2.98	1.02	41.58	41.50	83.90	79.34	564.80	538.40	11.58	11.14
PH990M2 128	2.19	*	3.28	1.10	*	*	*	*	*	*	*	*
PH990M3 251	2.40	33.50	3.29	1.11	*	*	*	*	*	*	*	*
PH990M4 364	2.45	36.60	3.34	1.13	*	*	*	*	*	*	*	*
PH990M5 503	2.44	35.60	3.32	1.12	*	*	*	*	*	*	*	*
PH990M6 626	2.40	31.80	3.33	1.12	*	*	*	*	*	*	*	*
PH990M7 728	2.41	36.20	3.31	1.14	63.00	*	77.50	*	363.00	*	*	*
ASTM #2 OIL SATURATED 23°C												
PL010M3 1	1.89	31.10	2.99	1.00	41.18	37.60	81.26	78.90	501.50	562.88	13.55	12.74
PL010M1 1	1.91	31.50	1.00	1.01	41.46	38.30	84.46	77.30	513.20	528.80	13.38	13.26
PL010M2 1	1.93	31.70	2.99	1.00	41.26	38.06	82.42	78.62	497.90	553.90	12.90	11.46
PL070M1 7	1.92	31.70	2.99	1.00	42.62	40.34	84.98	79.78	521.50	542.70	11.66	11.02
PL070M2 7	1.90	31.10	3.00	1.00	40.74	38.62	83.62	78.38	527.90	563.20	11.30	10.74
PL070M3 7	1.91	31.40	3.00	1.00	40.95	38.82	83.86	77.54	522.90	543.20	10.98	11.10
PL140M2 14	1.91	31.40	3.01	1.01	40.86	38.66	84.14	77.26	527.40	541.70	11.58	10.54
PL140M1 14	1.91	31.60	3.00	1.01	42.34	40.10	82.23	80.50	497.80	565.20	13.30	13.18
PL140M3 14	1.91	31.30	3.00	1.01	36.40	38.46	83.80	79.66	538.00	557.30	11.42	10.74
PL280M1 28	1.91	31.40	3.00	1.00	44.10	44.10	83.50	83.50	473.00	473.00	10.60	10.10
PL280M2 28	1.92	31.50	3.00	1.00	40.66	38.34	81.30	79.54	482.80	550.50	13.82	13.10
PL280M3 28	1.92	31.50	3.00	1.01	41.30	37.98	82.74	78.02	496.40	535.50	14.22	13.66

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
ASTM #2 OIL SATURATED 23°C												
PL990M1 28	1.89	32.30	2.99	1.00	*	*	*	*	*	*	*	*
PL560M2 56	1.90	31.20	3.00	1.01	39.38	37.18	82.45	77.78	513.00	587.50	11.98	11.50
PL560M1 56	1.92	31.60	3.01	1.00	47.26	39.26	84.34	82.58	474.90	552.20	11.78	11.06
PL560M3 56	1.93	31.80	3.00	1.00	39.26	38.58	80.74	80.46	528.00	532.30	11.66	11.98
PL990M2 128	1.90	31.50	3.00	1.00	*	*	*	*	*	*	*	*
PL990M3 237	1.89	31.60	2.99	1.00	*	*	*	*	*	*	*	*
PL990M4 364	1.91	31.60	2.99	1.00	*	*	*	*	*	*	*	*
PL990M5 503	1.88	31.40	2.97	1.00	*	*	*	*	*	*	*	*
PL990M6 626	1.85	31.50	2.97	0.99	*	*	*	*	*	*	*	*
PL990M7 730	1.86	32.30	2.96	1.00	52.40	*	88.40	*	617.00	*	*	*
ASTM #2 OIL 100.0% 50°C												
PH010P1 1	1.85	31.40	2.94	0.99	43.22	41.54	82.86	78.78	529.90	544.10	11.14	10.62
PH070P1 7	1.77	30.90	2.88	0.98	59.10	57.13	84.34	85.20	393.10	452.20	13.64	12.86
PH140P1 14	1.75	31.10	2.86	0.97	64.05	62.50	87.95	88.74	386.00	459.10	15.93	14.53
PH280P1 28	1.68	30.20	2.82	0.95	70.76	72.82	87.66	91.82	410.60	383.30	18.98	18.18
PH990P1 28	1.69	30.90	2.82	0.95	*	*	*	*	*	*	*	*
PH560P1 56	1.68	31.10	2.93	0.98	84.86	80.50	94.98	92.30	390.50	424.20	22.30	21.82
PH990P2 141	1.62	31.50	2.77	0.93	*	*	*	*	*	*	*	*
PH990P3 257	1.61	30.30	2.75	0.93	*	*	*	*	*	*	*	*
PH990P4 385	1.58	29.80	2.74	0.92	*	*	*	*	*	*	*	*
PH990P5 509	1.58	30.10	2.74	0.92	*	*	*	*	*	*	*	*
PH990P6 627	1.58	29.70	2.74	0.92	*	*	*	*	*	*	*	*
PH990P7 734	1.57	29.80	2.91	0.92	*	*	165.50	*	60.75	*	*	*
ASTM #2 OIL 100.0% 23°C												
PL010P1 1	1.88	31.30	2.98	1.00	40.42	37.90	86.22	79.50	566.50	574.40	10.18	9.62
PL010P3 1	1.88	31.20	2.99	1.00	43.10	40.62	87.18	78.02	505.70	490.60	13.66	13.54
PL010P2 1	1.90	31.40	2.98	1.00	44.58	41.18	85.98	81.46	490.00	543.50	16.78	15.50
PL070P2 7	1.88	31.20	2.97	1.00	44.82	41.14	87.78	77.82	577.30	554.00	11.14	10.42
PL070P3 7	1.85	30.90	2.97	1.00	42.14	40.14	78.54	78.22	528.30	544.50	10.30	10.10
PL070P1 7	1.86	31.00	2.98	1.00	48.90	44.58	88.78	83.66	466.90	514.80	10.68	10.32
PL140P2 14	1.86	31.20	2.96	0.99	47.54	44.34	87.18	82.06	499.80	547.90	12.62	11.50
PL140P3 14	1.84	31.10	2.96	0.99	46.54	44.46	83.98	80.06	488.40	521.00	12.90	11.62
PL140P1 14	1.87	31.30	2.97	0.99	52.98	49.42	89.06	86.54	461.80	518.50	11.00	10.48
PL280P1 28	1.84	31.20	2.94	0.99	50.58	50.70	87.58	85.54	461.30	478.80	16.98	17.54
PL280P3 28	1.85	31.20	2.95	0.99	54.22	50.98	88.50	84.94	445.60	489.00	13.30	12.82
PL280P2 28	1.84	31.40	2.95	0.99	50.90	47.82	87.82	83.38	471.40	500.30	15.98	17.58
PL990P1 28	1.83	31.40	2.94	0.98	*	*	*	*	*	*	*	*
PL560P2 55	1.82	30.70	2.80	0.95	57.22	54.14	89.62	83.98	466.40	476.20	14.54	14.62
PL560P3 55	1.83	31.10	2.94	0.99	54.86	50.94	83.94	83.86	410.00	502.50	13.74	13.82
PL560P1 56	1.82	31.20	2.93	0.98	58.90	54.58	91.06	85.42	471.20	497.10	14.30	13.90
PL990P2 141	1.77	31.00	2.90	0.97	*	*	*	*	*	*	*	*
PL990P3 244	1.73	30.50	2.88	0.96	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
					ASTM #2 OIL 100.0% 23°C							
PL990P4 385	1.71	30.20	2.87	0.96	*	*	*	*	*	*	*	*
PL990P5 509	1.70	30.50	2.85	0.95	*	*	*	*	*	*	*	*
PL990P6 627	1.69	30.00	2.85	0.95	*	*	*	*	*	*	*	*
PL990P7 736	1.68	30.90	2.84	0.95	75.00	*	87.00	*	463.00	*	*	*
					PHENOL 8.0% 50°C							
PH01PH1 1	1.94	31.70	2.97	1.01	38.02	35.08	76.70	71.05	433.78	440.40	8.82	8.64
PH07PH1 7	1.75	31.10	2.80	0.96	54.79	51.96	88.46	86.04	408.13	444.98	14.43	14.16
PH14PH1 14	1.70	30.40	2.89	0.95	55.23	52.62	88.65	87.33	435.79	479.50	10.92	10.75
PH28PH1 28	1.72	31.20	2.77	0.95	55.06	53.19	88.06	86.63	456.31	463.28	15.97	15.11
PH99PH1 29	1.81	31.30	2.87	0.97	*	*	*	*	*	*	*	*
PH56PH1 56	1.71	31.00	2.77	0.95	55.80	52.10	86.60	80.80	441.95	454.15	16.29	15.61
PH99PH2 121	1.75	31.40	2.87	0.97	*	*	*	*	*	*	*	*
PH99PH3 243	1.84	31.50	2.88	0.97	*	*	*	*	*	*	*	*
PH99PH4 362	1.79	31.50	2.85	0.97	*	*	*	*	*	*	*	*
PH99PH5 499	1.89	31.90	2.92	0.99	*	*	*	*	*	*	*	*
PH99PH6 624	1.84	31.50	2.87	0.97	*	*	*	*	*	*	*	*
PH99PH7 720	1.79	31.20	2.83	0.97	68.00	*	77.00	*	306.00	*	*	*
					PHENOL 8.0% 23°C							
PL01PH1 1	2.09	32.20	3.08	1.03	31.07	27.85	71.01	65.96	417.23	452.55	8.34	7.79
PL01PH2 1	2.09	32.30	3.07	1.03	31.04	27.88	66.67	68.05	412.75	488.68	8.57	7.78
PL01PH3 1	2.08	32.10	3.07	1.03	29.88	27.85	69.96	66.70	452.08	485.33	8.87	8.09
PL07PH1 7	1.80	30.60	2.89	0.98	44.14	41.01	81.37	76.61	398.03	416.00	13.05	12.35
PL07PH2 7	1.81	31.00	2.88	0.97	44.73	41.15	87.68	82.11	472.48	490.40	12.75	12.04
PL07PH3 7	1.81	30.90	2.87	0.97	44.48	41.10	88.73	82.06	478.78	499.83	12.46	11.84
PL14PH2 14	1.76	30.80	2.83	0.96	45.81	42.51	89.30	84.99	439.83	473.95	12.78	12.47
PL14PH1 14	1.76	30.60	2.85	0.96	46.14	43.59	85.65	83.73	428.38	474.53	13.07	12.70
PL14PH3 14	1.77	30.70	2.85	0.96	43.08	45.37	85.02	89.69	497.88	448.13	13.05	12.51
PL28PH2 28	1.73	30.60	2.82	0.95	47.33	45.50	87.83	84.00	436.29	456.80	14.34	13.44
PL28PH3 28	1.71	30.20	2.82	0.95	47.69	44.15	87.81	80.80	462.25	468.65	13.79	13.02
PL28PH1 28	1.72	30.30	2.82	0.95	48.35	44.00	86.85	81.10	451.78	489.20	14.30	13.83
PL99PH1 29	1.82	31.00	2.89	0.97	*	*	*	*	*	*	*	*
PL56PH1 56	1.69	30.20	2.79	0.94	50.63	48.94	89.63	86.31	452.66	450.84	15.49	14.12
PL56PH2 56	1.69	30.40	2.78	0.94	54.08	49.19	87.92	82.31	410.63	495.47	15.53	14.97
PL56PH3 56	1.70	30.40	2.84	0.95	51.92	50.94	87.92	88.13	434.67	494.28	14.72	14.63
PL99PH2 121	1.75	31.10	2.85	0.95	*	*	*	*	*	*	*	*
PL99PH3 230	1.74	30.40	2.84	0.96	*	*	*	*	*	*	*	*
PL99PH4 362	1.72	30.80	2.83	0.95	*	*	*	*	*	*	*	*
PL99PH5 499	1.73	30.30	2.83	0.95	*	*	*	*	*	*	*	*
PL99PH6 625	1.63	30.20	2.74	0.92	*	*	*	*	*	*	*	*
PL99PH7 722	1.59	30.20	2.73	0.92	70.90	*	88.00	*	225.00	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 1.0% 50°C												
PH01PL1 1	1.96	32.00	3.00	1.01	41.19	37.20	82.75	82.18	402.78	464.38	9.39	9.12
PH07PL1 7	1.98	32.30	2.99	1.02	41.24	39.10	84.04	79.98	453.40	465.65	10.32	9.49
PH14PL1 14	2.00	32.60	2.99	1.02	38.44	36.43	82.77	80.30	485.03	506.78	9.65	9.09
PH99PL1 28	2.02	32.60	3.02	1.02	*	*	*	*	*	*	*	*
PH28PL1 28	2.00	32.70	3.00	1.02	37.44	35.70	79.75	80.55	505.41	535.80	9.87	9.14
PH56PL1 56	1.99	32.40	2.98	1.03	39.10	34.95	81.05	76.60	489.05	529.70	9.59	9.38
PH99PL2 122	2.03	32.50	3.03	1.02	*	*	*	*	*	*	*	*
PH99PL3 245	2.04	32.70	3.03	1.02	*	*	*	*	*	*	*	*
PH99PL4 363	2.04	33.20	3.04	1.02	*	*	*	*	*	*	*	*
PH99PL5 499	2.05	32.60	3.04	1.02	*	*	*	*	*	*	*	*
PH99PL6 625	2.08	32.90	3.02	1.03	*	*	*	*	*	*	*	*
PH99PL7 721	2.08	32.80	3.06	1.03	38.00	*	80.68	*	614.33	*	*	*
PHENOL 1.0% 23°C												
PL01PL2 1	1.90	31.00	3.01	1.00	42.22	39.97	86.10	84.22	452.48	507.15	10.14	10.11
PL01PL3 1	1.90	31.00	3.01	1.01	43.29	39.71	90.00	82.78	475.95	489.60	10.49	9.83
PL01PL1 1	1.91	31.20	3.01	1.00	42.44	*	85.62	84.40	418.90	481.00	9.38	8.63
PL07PL2 7	1.99	32.10	3.02	1.02	38.85	36.16	87.83	80.67	506.13	505.88	9.84	9.26
PL07PL1 7	1.97	31.90	3.03	1.02	40.65	36.84	84.30	78.85	428.03	453.88	10.95	10.24
PL07PL3 7	1.98	32.20	*	*	37.77	34.38	86.52	81.64	503.93	543.60	9.48	8.92
PL14PL2 -14	1.97	31.90	3.02	1.01	37.47	34.74	87.97	82.16	499.43	528.83	9.37	8.84
PL14PL3 14	1.96	31.90	3.02	1.01	38.57	34.72	89.03	84.67	501.85	552.20	9.61	8.82
PL14PL1 14	1.98	32.00	3.03	1.02	37.22	34.34	83.47	83.95	474.70	543.85	9.38	8.99
PL28PL1 28	1.98	32.00	3.02	1.02	36.70	34.75	83.75	79.45	512.78	542.08	9.56	9.18
PL28PL3 28	1.99	32.20	3.02	1.02	35.90	33.05	77.90	79.05	482.55	536.20	9.25	8.50
PL28PL2 28	1.99	32.20	3.02	1.02	34.90	32.75	81.45	78.60	507.88	557.55	9.35	8.64
PL99PL1 28	2.02	31.80	3.03	1.01	*	*	*	*	*	*	*	*
PL56PL3 56	2.00	32.20	3.03	1.02	35.20	34.45	82.80	81.60	554.95	571.25	9.57	9.02
PL56PL1 56	1.98	32.10	3.01	1.02	38.10	34.50	83.70	80.10	479.00	545.18	8.91	9.03
PL56PL2 56	1.97	32.00	3.02	1.02	35.55	33.25	83.75	77.75	513.68	543.53	9.45	8.50
PL99PL2 122	2.02	32.50	3.04	1.01	*	*	*	*	*	*	*	*
PL99PL3 233	2.02	32.60	3.04	1.02	*	*	*	*	*	*	*	*
PL99PL4 363	2.03	32.70	3.04	1.02	*	*	*	*	*	*	*	*
PL99PL5 499	2.03	32.50	3.04	1.01	*	*	*	*	*	*	*	*
PL99PL6 626	2.05	32.70	3.05	1.02	*	*	*	*	*	*	*	*
PL99PL7 723	2.05	32.80	3.05	1.02	39.42	*	89.77	*	679.50	*	*	*
PHENOL 4.0% 50°C												
PH01PM1 1	2.03	32.40	3.02	1.03	34.77	32.55	75.28	69.73	427.38	433.80	7.91	7.17
PH07PM1 7	1.91	32.10	2.92	1.00	44.41	42.03	83.10	79.07	430.40	449.45	11.01	10.65
PH14PM1 14	1.89	31.70	2.92	1.00	43.44	40.78	82.99	80.74	466.03	495.85	15.45	14.99
PH28PM1 28	1.87	31.50	2.91	0.99	44.75	42.80	85.55	82.25	467.50	486.88	12.48	11.10
PH99PM1 29	2.04	32.50	3.02	1.02	*	*	*	*	*	*	*	*
PH56PM1 56	1.82	31.30	2.88	0.99	47.60	44.80	88.85	81.05	471.90	467.25	11.89	11.75

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PH99PM2 121	2.01	32.40	3.01	1.02	*	*	*	*	*	*	*	*
PH99PM3 244	1.97	32.20	2.99	1.01	*	*	*	*	*	*	*	*
PH99PM4 362	1.98	32.30	3.00	1.02	*	*	*	*	*	*	*	*
PH99PM5 499	1.98	32.50	2.98	1.01	*	*	*	*	*	*	*	*
PH99PM6 624	1.96	32.10	2.98	1.01	*	*	*	*	*	*	*	*
PH99PM7 720	1.93	32.10	2.96	1.01	56.30	*	90.30	*	668.00	*	*	*
PHENOL 4.0% 23°C												
PL01PM2 1	2.03	31.80	3.07	1.03	33.11	29.85	78.00	73.55	463.05	498.25	9.74	8.06
PL01PM1 1	2.02	31.70	3.07	1.03	32.64	29.79	76.80	75.12	436.68	487.08	8.58	7.61
PL01PM3 1	2.03	31.70	3.07	1.03	32.30	30.03	76.16	74.20	456.58	500.58	8.87	8.17
PL07PM2 7	1.98	32.10	3.00	1.01	37.26	34.25	85.06	80.40	485.05	504.23	9.82	8.97
PL07PM1 7	2.01	32.10	3.02	1.01	37.61	34.50	80.82	73.16	435.48	433.83	9.48	9.16
PL07PM3 7	1.96	31.90	2.99	1.01	35.75	32.89	84.10	79.89	501.16	518.83	9.46	8.91
PL14PM3 14	1.92	31.50	2.97	1.00	37.04	34.30	81.71	80.83	449.33	505.85	9.90	9.10
PL14PM2 14	1.95	31.90	2.98	1.00	36.40	33.66	86.33	78.94	506.20	489.65	9.91	9.14
PL14PM1 14	1.94	31.80	2.98	1.00	37.49	34.53	84.99	77.96	490.88	486.70	10.15	9.57
PL28PM1 28	1.90	31.50	2.95	0.99	38.80	37.15	83.95	79.45	469.23	475.05	10.84	10.29
PL28PM3 28	1.87	31.20	2.94	0.99	38.20	36.65	86.70	81.30	493.00	505.45	10.70	10.25
PL28PM2 28	1.90	31.50	2.96	0.99	38.35	36.15	84.65	78.75	456.13	470.38	10.51	9.95
PL99PM1 29	1.99	31.90	3.03	1.01	*	*	*	*	*	*	*	*
PL56PM2 56	1.87	31.30	2.93	0.99	40.20	38.35	82.30	83.35	535.50	541.78	11.40	10.80
PL56PM3 56	1.86	31.20	2.94	0.98	40.15	37.15	88.50	78.95	581.03	558.53	11.94	10.82
PL56PM1 56	1.84	31.00	2.92	0.98	41.60	39.70	85.50	82.90	471.63	478.78	11.17	10.97
PL99PM2 121	2.00	31.90	3.04	1.02	*	*	*	*	*	*	*	*
PL99PM3 231	2.03	32.10	3.07	1.03	*	*	*	*	*	*	*	*
PL99PM4 362	1.99	32.00	3.02	1.01	*	*	*	*	*	*	*	*
PL99PM5 499	1.89	31.30	2.96	0.98	*	*	*	*	*	*	*	*
PL99PM6 625	1.85	30.80	2.92	0.98	*	*	*	*	*	*	*	*
PL99PM7 722	1.81	31.20	2.91	0.97	56.00	*	86.20	*	635.00	*	*	*
SODIUM CHLORIDE 35.0% 50°C												
PH01SH1 1	1.91	31.70	2.97	1.00	40.22	38.38	82.06	78.18	508.10	522.30	10.38	9.98
PH07SH1 7	1.88	*	3.00	1.01	41.18	38.55	84.66	79.45	572.30	579.00	10.26	9.54
PH14SH1 14	1.85	31.00	2.99	1.00	*	*	*	*	*	*	9.88	9.68
PH99SH1 28	1.91	31.60	2.97	1.00	*	*	*	*	*	*	*	*
PH28SH1 28	1.88	31.60	3.00	1.00	46.22	41.46	91.38	84.26	551.10	588.30	9.88	10.00
PH56SH1 56	1.88	31.40	3.00	1.00	44.38	41.62	83.98	80.46	494.40	523.60	10.92	10.44
PH99SH2 131	1.91	31.60	2.97	1.00	*	*	*	*	*	*	*	*
PH99SH3 253	1.92	31.70	2.97	1.00	*	*	*	*	*	*	*	*
PH99SH4 379	1.91	31.90	2.98	1.01	*	*	*	*	*	*	*	*
PH99SH5 510	1.90	31.50	2.97	1.00	*	*	*	*	*	*	*	*
PH99SH6 630	1.90	31.60	2.96	1.00	*	*	*	*	*	*	*	*
PH99SH7 734	1.90	31.70	2.97	1.01	49.23	*	84.53	*	632.83	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
					SODIUM CHLORIDE 35.0% 23°C							
PL01SH1 1	1.88	31.40	2.96	1.00	45.22	41.66	85.66	81.46	495.80	532.10	10.90	9.94
PL01SH2 1	1.90	31.60	2.99	1.00	47.14	43.94	86.54	80.98	482.50	505.80	10.42	9.46
PL01SH3 1	1.91	31.80	2.99	1.00	44.10	40.74	87.46	81.62	503.30	545.30	10.14	9.52
PL07SH2 7	1.89	31.20	2.99	1.00	41.94	38.58	85.10	77.06	519.70	515.40	10.06	9.86
PL07SH1 7	1.90	31.50	2.99	1.00	41.50	38.86	82.42	79.98	502.80	553.70	9.90	9.54
PL07SH3 7	1.90	31.40	2.99	1.00	38.30	36.54	88.70	80.90	683.20	632.10	9.70	9.20
PL14SH3 14	1.90	31.50	2.98	1.00	45.90	39.90	87.66	82.70	505.60	585.70	10.70	10.12
PL14SH1 14	1.91	31.90	3.00	1.00	*	*	*	*	*	*	9.92	9.48
PL14SH2 14	1.91	31.60	2.98	1.00	45.10	*	94.82	*	569.00	*	10.77	10.40
PL28SH2 28	1.89	31.20	3.00	1.00	42.74	45.50	85.30	95.86	519.30	583.00	10.24	10.40
PL28SH3 28	1.82	31.20	2.90	1.00	42.82	42.74	84.02	92.62	493.50	578.50	10.20	10.79
PL99SH1 28	1.90	31.50	2.99	1.00	*	*	*	*	*	*	*	*
PL28SH1 28	1.89	31.60	3.00	1.00	43.50	42.34	86.22	82.58	504.50	499.90	10.34	9.70
PL56SH1 56	1.89	31.50	3.00	1.00	40.78	35.30	88.38	85.62	539.70	718.70	10.57	9.68
PL56SH3 56	1.90	31.40	3.01	1.00	45.10	45.80	83.40	88.30	502.00	519.00	9.68	10.62
PL56SH2 56	1.90	31.30	3.01	1.00	44.26	47.78	82.46	90.38	522.70	508.10	10.28	*
PL99SH2 131	1.90	31.40	2.99	1.00	*	*	*	*	*	*	*	*
PL99SH3 246	1.90	31.70	2.99	1.00	*	*	*	*	*	*	*	*
PL99SH4 379	1.90	31.60	2.99	1.00	*	*	*	*	*	*	*	*
PL99SH5 510	1.90	31.40	2.99	1.00	*	*	*	*	*	*	*	*
PL99SH6 630	1.90	31.30	2.99	1.00	*	*	*	*	*	*	*	*
PL99SH7 736	1.89	31.60	2.99	1.00	46.50	*	92.30	*	662.20	*	*	*
					SODIUM CHLORIDE 10.0% 50°C							
PH01SM1 1	1.87	31.30	2.99	1.01	44.46	43.34	86.14	83.30	461.10	486.30	10.22	9.50
PH07SM1 7	1.87	31.50	2.97	1.00	46.78	43.50	87.94	80.60	523.50	502.10	10.58	10.94
PH14SM1 14	32.64	31.90	7.42	6.86	49.10	45.14	90.74	85.22	467.20	495.00	10.94	10.94
PH28SM1 28	32.17	31.60	7.38	6.87	45.42	42.58	85.26	81.62	500.40	537.70	10.98	10.94
PH99SM1 28	1.89	31.50	2.97	1.00	*	*	*	*	*	*	*	*
PH56SM1 61	32.59	31.90	7.43	6.87	46.62	48.14	85.90	80.54	470.20	456.00	11.82	11.66
PH99SM2 132	1.89	31.40	2.97	1.00	*	*	*	*	*	*	*	*
PH99SM3 254	1.91	31.40	2.97	1.00	*	*	*	*	*	*	*	*
PH99SM4 370	1.90	31.60	2.97	1.00	*	*	*	*	*	*	*	*
PH99SM5 511	1.90	32.00	2.97	1.00	*	*	*	*	*	*	*	*
PH99SM6 624	1.89	31.30	2.96	1.00	*	*	*	*	*	*	*	*
PH99SM7 735	1.88	31.50	2.97	1.00	50.20	*	91.60	*	633.00	*	*	*
					SODIUM CHLORIDE 10.0% 23°C							
PL01SM2 1	1.87	31.40	3.01	1.01	46.26	41.94	88.98	78.30	457.90	435.60	9.94	9.66
PL01SM3 1	1.91	31.90	3.01	1.01	45.42	41.50	87.02	79.50	456.80	447.20	9.82	9.58
PL01SM1 1	1.87	31.40	3.01	1.01	44.94	41.46	86.14	80.70	459.10	467.00	9.86	9.50
PL07SM2 7	1.88	31.60	3.00	1.00	45.10	40.94	85.62	80.74	495.00	525.30	10.98	10.30
PL07SM3 7	1.86	31.30	2.99	1.00	45.54	41.94	89.06	82.66	524.60	542.80	11.18	9.98
PL07SM1 7	1.84	31.00	3.00	1.00	43.70	43.74	88.10	82.46	546.20	518.90	11.30	9.98

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM CHLORIDE 10.0% 23°C												
PL14SM1 14	32.39	31.50	7.42	6.92	47.00	44.40	88.90	84.70	449.70	475.80	11.10	10.90
PL14SM3 15	1.90	31.80	3.00	1.00	50.78	49.38	85.42	86.10	399.90	467.90	12.06	11.66
PL14SM2 15	1.90	31.90	3.00	1.00	50.50	47.30	87.26	83.18	437.60	468.00	11.78	11.38
PL99SM1 28	1.90	31.40	3.00	1.00	*	*	*	*	*	*	*	*
PL28SM3 28	32.69	31.70	7.40	6.92	45.70	40.34	89.78	82.94	471.50	531.60	10.06	9.78
PL28SM2 28	31.98	31.50	7.21	7.00	42.98	40.14	85.74	84.10	469.40	561.70	10.74	9.82
PL28SM1 28	32.51	31.40	7.45	6.91	43.78	39.34	88.38	80.94	481.10	554.50	10.06	10.30
PL56SM2 56	32.37	31.60	7.41	6.88	43.58	43.22	84.70	80.90	449.50	475.70	11.22	10.54
PL56SM3 56	32.60	31.60	7.42	6.95	44.80	44.02	87.30	81.46	457.63	461.60	11.02	11.00
PL56SM1 61	32.69	31.80	7.43	6.95	49.18	41.14	89.18	79.22	457.20	484.00	12.02	10.94
PL99SM2 132	1.90	31.30	3.00	1.00	*	*	*	*	*	*	*	*
PL99SM3 246	1.89	31.40	3.00	1.01	*	*	*	*	*	*	*	*
PL99SM4 370	1.90	31.50	3.00	1.00	*	*	*	*	*	*	*	*
PL99SM5 511	1.89	31.30	2.99	1.00	*	*	*	*	*	*	*	*
PL99SM6 624	1.88	31.30	2.98	1.00	*	*	*	*	*	*	*	*
PL99SM7 737	1.88	31.70	2.99	1.00	46.00	*	89.00	*	604.00	*	*	*
WATER 100.0% 50°C												
PH01WP1 1	1.92	32.00	3.00	1.00	46.94	44.70	85.46	82.10	415.70	451.30	10.66	10.30
PH07WP1 7	1.92	31.90	2.98	1.02	42.82	40.90	87.58	81.66	539.60	542.70	10.62	10.50
PH14WP1 14	33.78	32.20	7.49	6.99	54.97	50.97	89.50	85.60	403.20	445.75	11.18	10.38
PH28WP1 28	1.96	32.30	2.98	1.01	44.58	44.22	80.54	81.90	445.80	487.90	11.18	10.74
PH99WP1 28	1.94	32.00	2.99	1.01	*	*	*	*	*	*	*	*
PH56WP1 56	32.91	31.90	7.37	6.96	49.62	46.14	87.18	78.98	421.40	460.90	11.30	10.86
PH99WP2 133	1.95	32.30	2.99	1.01	*	*	*	*	*	*	*	*
PH99WP3 254	1.96	32.00	2.99	1.01	*	*	*	*	*	*	*	*
PH99WP4 370	1.95	32.40	2.99	1.02	*	*	*	*	*	*	*	*
PH99WP5 503	1.95	32.00	2.99	1.01	*	*	*	*	*	*	*	*
PH99WP6 622	1.95	31.90	2.99	1.01	*	*	*	*	*	*	*	*
PH99WP7 735	1.95	32.20	2.99	1.01	45.55	*	83.58	*	664.58	*	*	*
WATER 100.0% 23°C												
PL01WP2 1	1.89	31.70	3.00	1.00	47.70	45.34	90.34	85.54	473.00	468.00	10.50	10.22
PL01WP1 1	1.90	31.80	3.00	1.00	48.66	45.10	90.86	86.34	479.40	522.00	10.46	10.06
PL01WP3 1	1.89	31.70	3.00	1.00	47.54	46.38	92.22	85.78	499.10	482.10	10.58	10.14
PL07WP2 7	1.92	32.00	3.00	1.00	43.46	39.62	87.46	82.58	487.20	529.00	10.22	10.50
PL07WP1 7	1.91	31.60	3.01	1.01	43.02	41.22	84.58	82.66	466.40	513.30	10.34	10.42
PL07WP3 7	1.90	31.50	3.01	1.02	43.26	40.06	84.14	79.58	449.20	533.90	10.62	10.14
PL14WP1 14	32.85	31.90	7.43	6.97	48.14	48.20	85.14	87.70	401.60	461.00	11.42	10.26
PL14WP2 14	1.91	31.40	3.00	1.00	46.02	42.94	85.54	83.06	450.70	489.90	10.22	9.70
PL14WP3 14	1.93	31.90	3.00	1.00	45.50	43.22	86.10	82.98	460.20	493.50	10.50	9.90
PL28WP1 28	1.91	31.60	3.00	1.00	47.38	44.78	87.82	84.10	473.90	511.20	11.26	10.26
PL99WP1 28	1.92	31.70	2.99	1.00	*	*	*	*	*	*	*	*
PL28WP2 28	1.89	31.50	3.00	1.00	47.30	39.90	87.30	81.50	462.60	538.80	10.10	10.00

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
					WATER 100.0% 23°C								
PL28WP3	28	1.92	32.10	3.00	1.00	47.50	41.10	89.50	84.30	531.10	561.80	11.50	9.70
PL56WP3	56	1.91	31.60	2.99	1.01	55.46	52.49	88.26	74.31	408.90	406.70	11.92	11.73
PL56WP2	56	1.92	31.70	3.00	1.00	51.22	48.14	84.80	80.94	422.00	430.70	12.10	11.56
PL56WP1	56	32.58	31.50	7.42	6.94	48.86	46.45	87.10	78.66	461.20	424.90	11.06	10.46
PL99WP2	132	1.93	31.60	2.99	1.00	*	*	*	*	*	*	*	*
PL99WP3	247	1.91	31.70	3.02	1.03	*	*	*	*	*	*	*	*
PL99WP4	370	1.93	31.80	3.00	1.01	*	*	*	*	*	*	*	*
PL99WP5	503	1.93	31.70	2.99	1.00	*	*	*	*	*	*	*	*
PL99WP6	622	1.92	31.60	3.00	1.00	*	*	*	*	*	*	*	*
PL99WP7	737	1.91	31.80	3.00	1.00	47.75	*	93.00	*	637.00	*	*	*
					POTASSIUM DICHROMATE 10.0% 50°C								
PH01XM1	1	1.90	31.30	3.00	1.00	42.10	37.50	85.50	79.98	458.00	597.60	9.95	10.60
PH07XM1	7	1.93	31.70	3.00	1.00	45.06	44.98	90.50	84.74	524.80	502.80	10.64	10.14
PH14XM1	14	1.89	31.50	2.99	1.00	48.06	46.70	90.38	82.62	497.20	471.90	11.40	10.66
PH99XM1	28	1.92	31.80	2.98	1.00	*	*	*	*	*	*	*	*
PH28XM1	28	1.89	31.80	3.03	0.99	43.90	46.18	86.86	81.46	484.40	486.30	10.54	10.42
PH56XM1	56	1.90	31.70	2.97	1.01	47.42	42.74	88.50	82.98	490.00	543.50	11.00	10.80
PH99XM2	118	1.92	31.80	2.99	1.00	*	*	*	*	*	*	*	*
PH99XM3	231	1.93	31.70	2.99	1.00	*	*	*	*	*	*	*	*
PH99XM4	363	1.92	31.80	2.99	1.00	*	*	*	*	*	*	*	*
PH99XM5	489	1.92	31.70	2.99	1.00	*	*	*	*	*	*	*	*
PH99XM6	609	1.92	31.70	2.98	1.00	*	*	*	*	*	*	*	*
PH99XM7	712	1.91	31.70	2.99	1.00	49.80	*	88.20	*	569.00	*	*	*
					POTASSIUM DICHROMATE 10.0% 23°C								
PL01XM2	1	1.89	31.20	3.00	1.00	49.26	43.22	94.38	83.94	484.20	528.30	11.50	10.82
PL01XM1	1	1.91	31.60	3.01	1.00	45.90	39.06	86.30	84.62	484.60	605.50	10.08	10.24
PL01XM3	1	1.89	31.30	3.00	1.00	49.34	40.78	89.86	76.66	455.10	443.00	10.76	10.88
PL07XM3	7	1.92	31.70	3.00	1.00	46.94	41.70	84.38	77.14	415.60	433.40	11.10	11.86
PL07XM1	7	1.92	31.60	3.00	1.00	43.86	42.18	89.34	83.62	500.20	499.10	11.00	10.42
PL07XM2	7	1.91	31.30	3.01	1.00	47.54	41.98	84.78	77.62	407.30	427.60	11.32	10.62
PL14XM3	14	1.90	31.20	3.00	1.00	36.46	40.46	81.10	83.62	482.40	469.80	9.56	10.38
PL14XM1	14	1.89	31.50	3.00	1.00	46.18	45.78	86.98	84.02	454.30	464.80	11.46	10.36
PL14XM2	14	1.90	31.20	3.00	1.00	38.66	42.18	82.94	90.74	511.10	485.50	9.88	10.06
PL28XM2	28	1.93	31.80	3.01	1.00	45.18	40.90	87.50	87.42	530.20	489.00	10.64	10.82
PL28XM3	28	1.89	31.10	3.00	1.00	42.66	39.98	86.78	88.38	594.90	528.00	11.08	11.20
PL99XM1	28	1.92	31.70	3.00	1.00	*	*	*	*	*	*	*	*
PL28XM1	28	1.89	31.60	3.01	1.00	43.58	40.06	85.90	81.26	451.60	487.30	10.58	10.50
PL56XM3	56	*	31.50	3.01	1.00	43.30	38.74	89.94	81.82	503.90	518.50	10.44	9.70
PL56XM2	56	*	31.30	3.01	1.00	42.70	39.50	85.34	80.74	474.00	506.70	10.62	10.24
PL56XM1	56	1.90	31.50	3.01	1.01	42.98	39.06	89.82	82.58	522.40	574.10	9.85	10.30
PL99XM2	118	1.92	31.60	3.00	1.00	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
POTASSIUM DICHROMATE 10.0% 23°C												
PL99XM3 223	1.92	31.70	3.00	1.00	*	*	*	*	*	*	*	*
PL99XM4 363	1.92	31.70	3.00	1.00	*	*	*	*	*	*	*	*
PL99XM5 489	1.92	31.60	3.00	1.00	*	*	*	*	*	*	*	*
PL99XM6 609	1.92	31.60	3.00	1.00	*	*	*	*	*	*	*	*
PL99XM7 714	1.91	31.80	3.00	1.00	47.30	*	90.20	*	604.50	*	*	*

PVC : STATISTICS

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
						HYDROCHLORIC ACID 10.0% 50°C						
PH01AM1 1	5	1.960	5	1.900	5	39.698	5	18.910	5	0.415	5	0.385
PH07AM1 7	5	2.755	4	1.710	5	27.641	4	20.900	5	0.517	5	0.228
PH14AM1 14	5	4.303	5	1.368	5	36.950	5	24.000	5	0.469	5	0.684
PH28AM1 29	5	2.861	5	2.480	5	26.180	5	11.778	10	0.550	10	0.694
PH56AM1 56	5	1.492	5	1.819	5	16.740	5	9.990	5	0.261	5	0.335
						HYDROCHLORIC ACID 10.0% 23°C						
PL01AM1 1	5	3.705	5	2.633	5	55.150	5	25.399	5	0.167	5	0.762
PL01AM2 1	5	5.604	5	2.608	5	75.114	5	26.640	5	0.856	5	0.498
PL01AM3 1	5	2.700	5	2.479	5	34.050	5	63.128	5	0.303	5	0.316
PL07AM2 7	4	1.400	3	2.120	4	30.330	3	31.800	6	0.669	5	0.329
PL07AM3 7	4	1.410	3	0.830	4	30.250	3	12.740	5	0.767	5	0.955
PL07AM1 7	4	3.890	3	2.390	4	32.100	3	23.860	5	0.657	5	0.110
PL14AM1 14	5	3.340	5	3.269	5	25.590	5	18.210	5	0.415	5	0.261
PL14AM2 14	5	2.483	5	2.180	5	25.620	5	38.740	5	0.261	5	0.410
PL14AM3 14	5	2.900	4	3.590	5	26.893	4	36.550	5	0.363	5	0.329
PL28AM1 29	5	3.870	5	2.997	5	18.990	5	43.860	10	0.843	10	0.485
PL28AM2 29	5	3.064	5	1.790	5	50.040	5	36.965	10	0.267	5	1.500
PL28AM3 29	5	1.307	5	2.947	5	25.756	5	34.875	10	0.905	10	0.452
PL56AM2 56	5	6.337	5	1.419	5	59.883	5	12.682	5	0.865	5	0.583
PL56AM3 56	5	2.368	5	1.361	5	19.212	5	9.006	5	0.303	5	0.555
PL56AM1 56	5	2.310	5	0.737	5	25.650	5	7.040	5	0.460	5	0.518
						SODIUM HYDROXIDE 10.0% 50°C						
PH01BM1 1	5	2.224	5	2.090	5	37.618	5	27.994	10	0.287	10	0.290
PH07BM1 7	5	1.955	5	1.524	5	11.741	5	13.319	10	0.401	9	0.343
PH14BM1 14	5	1.922	5	3.923	5	25.530	5	36.626	5	0.593	10	1.940
PH28BM1 28	4	*	5	1.467	4	*	5	50.180	10	0.880	8	0.238
PH56BM1 56	5	3.973	5	2.166	5	43.239	5	5.160	7	0.611	6	0.487
						SODIUM HYDROXIDE 10.0% 23°C						
PL01BM2 1	5	1.243	5	0.779	5	8.306	5	16.481	10	0.366	10	0.422
PL01BM3 1	5	1.124	5	1.108	5	22.480	5	15.617	10	0.302	10	0.661
PL01BM1 1	5	2.540	5	2.508	5	37.930	5	22.613	9	0.609	10	0.435
PL07BM2 7	5	1.452	5	1.459	5	26.451	5	7.840	10	0.378	10	0.175
PL07BM1 7	5	1.668	5	2.559	5	21.204	5	29.650	10	0.301	10	0.227
PL07BM3 7	5	2.560	5	1.674	5	39.510	5	32.280	10	0.169	10	0.434
PL14BM1 14	5	2.982	4	0.680	5	36.493	4	8.990	10	0.893	10	0.394
PL14BM2 14	5	2.085	5	1.665	5	31.107	5	21.249	10	0.193	10	0.567
PL14BM3 14	5	0.923	5	5.081	5	17.962	5	61.303	10	0.283	10	0.199
PL28BM1 28	5	2.230	5	2.855	5	15.186	5	31.952	9	0.794	9	0.346
PL28BM2 28	5	3.245	5	0.783	5	40.436	5	15.724	10	0.234	10	0.216
PL28BM3 32	5	2.050	5	2.421	5	23.922	5	29.588	10	1.081	10	0.476

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
SODIUM HYDROXIDE 10.0% 23°C												
PL56BM3 56	5	4.086	5	2.500	5	37.093	5	28.300	7	0.400	7	0.509
PL56BM2 56	5	1.070	5	1.638	5	15.601	5	16.107	8	0.821	7	0.728
PL56BM1 56	5	4.572	5	1.126	5	43.287	5	19.556	8	0.671	8	0.518
1 2 DICHLOROETHANE .8% 50°C												
PH01DH1 1	5	3.166	5	1.161	5	26.200	5	15.952	5	0.378	5	0.202
PH07DH1 7	5	5.720	5	3.530	5	72.460	5	16.920	5	0.280	5	0.180
PH14DH1 14	4	3.600	5	2.510	4	12.900	5	42.600	5	0.102	5	0.150
PH28DH1 29	5	2.477	5	1.922	5	13.513	5	23.276	5	0.376	5	0.295
PH56DH1 56	5	3.204	5	1.516	5	30.998	5	11.175	5	0.155	5	0.331
1 2 DICHLOROETHANE .8% 23°C												
PL01DH2 1	5	4.378	5	1.358	5	43.549	5	9.493	5	0.517	5	0.338
PL01DH3 1	5	5.826	5	0.977	5	27.609	5	40.878	5	0.293	5	0.161
PL01DH1 1	5	3.771	5	3.131	5	15.540	5	24.703	5	0.324	5	0.093
PL07DH1 7	5	2.800	4	1.640	5	19.040	4	18.040	5	0.230	5	0.580
PL07DH3 7	5	6.200	5	1.700	5	49.600	5	14.900	5	0.611	5	0.630
PL07DH2 7	5	4.980	4	6.030	5	71.470	4	51.800	4	0.150	5	0.920
PL14DH1 14	4	5.580	5	1.980	4	21.560	5	22.950	5	0.223	5	0.072
PL14DH3 14	5	3.220	5	1.700	5	25.880	5	14.360	5	0.530	5	0.340
PL14DH2 14	5	5.190	5	6.090	5	12.280	5	18.220	5	0.150	4	0.430
PL28DH2 28	5	*	5	*	5	*	5	*	5	0.840	5	0.361
PL28DH3 28	5	*	5	*	5	*	5	*	5	0.160	5	0.161
PL28DH1 29	5	3.093	5	3.210	5	18.576	5	20.777	5	0.174	5	0.108
PL56DH1 56	5	1.671	5	1.150	5	21.268	5	11.162	5	0.310	5	0.323
PL56DH2 56	5	0.954	5	2.152	5	5.003	5	17.227	5	0.857	4	0.197
PL56DH3 56	5	1.889	5	4.773	5	4.896	5	47.200	5	0.427	5	0.091
1 2 DICHLOROETHANE .1% 50°C												
PH01DL1 1	5	0.920	5	1.129	5	13.600	5	12.371	5	0.325	5	0.198
PH07DL1 7	4	1.850	4	0.760	4	20.420	4	11.960	5	0.340	5	0.260
PH14DL1 14	5	1.820	5	2.470	5	20.010	5	18.720	5	0.220	5	0.120
PH28DL1 29	5	1.243	5	0.839	5	8.076	5	8.055	5	0.380	5	0.360
PH56DL1 56	5	0.547	5	1.330	5	11.768	5	12.576	5	0.323	5	0.651
1 2 DICHLOROETHANE .1% 23°C												
PL01DL3 1	5	1.346	5	2.146	5	9.522	5	22.368	5	0.226	5	0.274
PL01DL2 1	5	1.475	5	1.678	5	6.565	5	17.994	5	0.352	5	0.448
PL01DL1 1	5	1.733	5	1.543	5	5.306	5	14.158	5	0.381	5	0.207
PL07DL2 7	5	4.220	5	1.600	4	30.800	4	17.000	5	0.400	5	0.171
PL07DL1 7	4	1.240	4	1.000	4	12.090	4	7.290	5	0.464	5	0.337
PL07DL3 7	5	1.110	5	1.770	5	7.110	5	16.500	5	0.438	5	0.180
PL14DL2 14	5	1.500	5	4.950	5	11.980	5	44.600	5	0.590	5	0.200
PL14DL1 14	5	5.750	5	1.970	5	54.280	5	16.360	5	0.100	5	0.150

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
1 2 DICHLOROETHANE .1% 23°C												
PL14DL3 14	5	1.470	5	1.110	5	14.040	5	14.650	5	0.780	5	0.180
PL28DL2 28	5	*	5	*	5	*	5	*	5	0.121	5	0.274
PL28DL3 28	5	*	5	*	5	*	5	*	5	0.352	5	0.140
PL28DL1 29	5	2.184	5	2.348	5	12.204	5	16.498	5	0.101	5	0.410
PL56DL1 56	5	1.572	5	1.711	5	10.235	5	9.001	5	0.179	5	0.509
PL56DL2 56	5	1.776	5	1.138	5	17.128	5	10.331	5	0.616	5	0.403
PL56DL3 56	5	1.231	5	4.454	5	2.811	5	48.259	5	0.281	5	0.221
1 2 DICHLOROETHANE .5% 50°C												
PH01DM1 1	5	2.159	5	1.466	5	8.759	5	12.757	5	0.188	5	0.149
PH07DM1 7	5	0.870	5	7.720	5	9.130	5	86.120	5	0.300	5	0.240
PH14DM1 14	5	1.450	5	0.410	5	9.580	5	9.000	5	0.380	5	0.390
PH28DM1 29	5	2.212	5	1.572	5	24.625	5	11.855	5	0.397	5	0.186
PH56DM1 56	5	2.828	5	0.621	5	16.639	5	9.439	5	0.091	5	0.372
1 2 DICHLOROETHANE .5% 23°C												
PL01DM3 1	5	1.675	5	1.981	5	13.143	5	20.472	5	0.317	5	0.328
PL01DM2 1	5	3.287	5	2.356	5	29.524	5	25.167	5	0.356	5	0.832
PL01DM1 1	5	2.666	5	1.716	5	15.655	5	15.970	5	0.342	5	0.159
PL07DM2 7	5	3.210	5	4.850	5	30.200	5	47.280	5	0.510	5	0.190
PL07DM1 7	5	1.720	5	1.320	5	24.610	5	17.940	5	0.310	5	0.180
PL07DM3 7	5	4.000	5	2.580	5	33.300	5	23.100	5	0.330	5	0.310
PL14DM2 14	5	0.810	5	1.050	5	9.100	5	11.610	5	0.240	5	0.530
PL14DM3 14	5	3.820	5	1.450	5	21.810	5	12.750	5	0.340	5	0.470
PL14DM1 14	5	4.100	5	2.040	5	13.090	5	19.090	5	0.320	5	0.200
PL28DM2 28	5	*	5	*	5	*	5	*	5	0.345	5	0.211
PL28DM3 28	5	*	5	*	5	*	5	*	5	0.139	5	0.303
PL28DM1 29	5	2.033	5	1.508	5	22.606	5	10.309	5	0.231	5	0.179
PL56DM3 56	5	0.945	5	2.030	5	12.023	5	10.535	5	0.142	5	0.061
PL56DM2 56	5	1.149	5	1.298	5	10.178	5	11.258	5	0.658	5	0.275
PL56DM1 56	5	2.864	5	1.899	5	10.347	5	8.615	5	0.357	5	0.128
FURFURAL 8.0% 50°C												
PH01FH1 1	5	1.193	5	0.968	5	20.740	5	16.050	5	0.241	5	0.451
PH07FH1 7	5	1.321	5	1.447	5	39.030	5	49.200	5	0.132	5	0.089
PH14FH1 14	5	1.566	5	1.997	5	29.690	5	43.930	5	0.223	5	0.079
PH28FH1 28	5	2.666	5	1.906	5	*	5	85.660	5	0.167	5	0.082
PH56FH1 56	5	1.274	5	1.602	5	41.430	5	74.700	5	0.082	5	0.134
FURFURAL 8.0% 23°C												
PL01FH3 1	5	2.073	5	2.171	5	68.407	5	54.296	5	0.471	5	0.895
PL01FH1 1	5	3.290	5	1.525	5	28.500	5	10.250	5	0.178	5	0.516
PL01FH2 1	5	2.712	5	2.204	5	94.231	5	66.128	5	0.278	5	0.520
PL07FH2 7	5	2.274	5	1.787	5	82.000	5	71.480	5	0.149	5	0.175

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				FURFURAL	8.0% 23^{o}C							
PL07FH3 7	5	2.040	5	1.070	5	46.040	5	29.200	5	0.255	5	0.233
PL07FH1 7	5	1.903	5	1.778	5	51.350	5	29.530	5	0.162	5	0.235
PL14FH2 14	5	2.007	5	1.218	5	62.050	5	56.860	5	0.057	5	0.148
PL14FH1 14	5	2.660	5	2.407	5	83.190	5	75.960	5	0.113	5	0.082
PL14FH3 14	5	1.403	5	2.255	5	22.080	5	68.870	5	0.182	5	0.182
PL28FH3 28	5	1.394	5	1.977	5	27.930	5	65.060	5	0.110	5	0.297
PL28FH1 28	5	1.950	5	2.104	5	18.170	5	69.070	5	0.269	5	0.103
PL28FH2 28	5	1.683	5	1.462	5	88.490	5	58.250	5	0.152	5	0.187
PL56FH2 56	5	0.929	5	2.025	5	40.990	5	59.350	5	0.157	5	0.050
PL56FH1 56	5	0.800	5	2.508	5	61.700	5	86.500	5	0.179	5	0.122
PL56FH3 56	5	1.681	5	1.132	5	47.750	5	25.980	5	0.185	5	0.122
				FURFURAL	1.0% 50^{o}C							
PH01FL1 1	5	1.314	5	1.480	5	16.714	5	13.029	5	0.274	5	0.982
PH07FL1 7	5	1.517	5	1.696	5	16.240	5	13.040	5	0.251	5	0.410
PH14FL1 14	5	1.870	5	2.980	5	24.920	5	32.860	5	0.503	5	0.964
PH28FL1 28	5	4.064	5	1.608	5	26.460	5	10.950	5	0.827	5	0.555
PH56FL1 56	5	3.270	5	1.992	5	23.450	5	34.280	5	0.890	5	0.550
				FURFURAL	1.0% 23^{o}C							
PL01FL3 1	5	3.780	4	5.300	5	33.770	4	44.600	5	0.414	5	0.931
PL01FL2 1	5	3.770	4	3.260	5	32.713	4	33.400	5	0.400	5	0.854
PL01FL1 1	5	1.705	5	1.646	5	10.216	5	16.579	5	0.242	5	1.011
PL07FL2 7	5	2.902	5	1.457	5	20.920	5	24.089	5	0.295	5	0.327
PL07FL1 7	5	1.851	5	3.800	5	10.250	5	37.910	5	0.569	5	0.422
PL07FL3 7	5	3.165	5	3.305	5	13.690	5	38.990	5	0.579	5	0.301
PL14FL2 14	5	2.721	5	1.173	5	25.000	5	37.520	5	0.485	5	0.100
PL14FL3 14	5	1.595	5	1.808	5	41.080	5	39.130	5	0.527	5	0.184
PL14FL1 14	5	2.040	5	4.290	5	8.200	5	16.730	5	0.055	5	0.308
PL28FL2 28	5	1.972	5	2.424	5	42.500	5	23.450	5	0.406	5	0.167
PL28FL1 28	5	7.029	5	0.581	5	4.080	5	30.330	5	0.208	5	0.407
PL28FL3 28	5	1.292	5	2.575	5	6.710	5	14.320	5	0.971	5	0.241
PL56FL3 56	5	1.303	5	0.527	5	24.390	5	20.000	5	0.167	5	0.270
PL56FL2 56	5	3.838	5	1.613	5	27.750	5	20.620	5	0.458	5	0.288
PL56FL1 56	5	4.245	5	2.263	5	59.310	5	37.750	5	0.532	5	0.200
				FURFURAL	4.0% 50^{o}C							
PH01FM1 1	5	5.249	5	2.266	5	65.196	5	30.997	5	0.249	5	0.118
PH07FM1 7	5	2.300	5	2.729	5	23.080	5	31.900	5	0.158	5	0.514
PH14FM1 14	5	2.430	5	0.439	5	27.420	5	14.800	5	0.235	5	0.250
PH28FM1 28	5	2.992	5	3.281	5	20.400	5	60.660	5	0.665	5	1.120
PH56FM1 56	5	3.986	5	4.621	5	91.060	5	45.880	5	0.207	5	0.498

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
FURFURAL 4.0% 23°C												
PL01FM1 1	5	2.081	5	1.634	5	24.752	5	19.987	5	0.484	5	0.689
PL01FM2 1	5	2.615	5	2.045	5	36.130	5	36.604	5	0.400	5	0.410
PL01FM3 1	5	2.518	5	3.341	5	32.598	5	51.615	5	0.394	5	0.282
PL07FM3 7	5	3.492	5	0.876	5	48.460	5	19.270	5	0.442	5	0.866
PL07FM2 7	5	5.720	5	1.986	5	46.940	5	31.570	5	0.243	5	0.203
PL07FM1 7	5	2.500	5	2.678	5	16.810	5	44.670	5	0.259	5	0.372
PL14FM1 14	5	3.500	5	1.710	5	33.470	5	26.770	5	0.195	5	0.497
PL14FM2 14	5	3.303	5	2.029	5	43.300	5	32.040	5	0.113	5	0.261
PL14FM3 14	5	1.912	5	1.350	5	25.000	5	20.620	5	0.197	5	0.095
PL28FM2 28	5	2.020	5	2.111	5	34.390	5	37.650	5	0.152	5	0.045
PL28FM3 28	5	2.265	5	1.507	5	57.510	5	23.870	5	0.217	5	0.354
PL28FM1 28	5	1.997	5	2.463	5	44.220	5	26.790	5	0.635	5	0.335
PL56FM1 56	5	3.487	5	2.006	5	46.720	5	32.860	5	0.335	5	0.263
PL56FM2 56	5	4.170	5	1.454	5	45.360	5	28.590	5	0.217	5	0.228
PL56FM3 56	5	2.275	5	4.423	5	28.280	5	37.680	5	0.239	5	0.164
METHYL ETHYL KETONE 26.0% 50°C												
PH01MH1 1	5	2.604	5	3.010	5	68.102	5	50.422	5	0.219	5	0.335
PH07MH1 7	4	1.370	5	1.889	4	89.250	5	51.480	5	0.712	5	1.030
PH14MH1 14	1	*	1	*	1	*	1	*	3	1.320	3	0.242
PH28MH1 28	5	0.706	5	1.555	5	35.106	5	67.413	5	0.005	5	0.178
PH56MH1 56	5	2.934	5	1.209	5	71.090	5	31.970	5	0.231	5	0.324
METHYL ETHYL KETONE 26.0% 23°C												
PL01MH1 1	5	2.914	5	1.197	5	23.767	5	27.130	5	0.335	5	0.261
PL01MH3 1	4	0.160	6	2.080	3	24.800	6	98.800	5	0.200	5	0.110
PL01MH2 1	5	2.715	5	1.025	5	*	5	*	5	0.350	5	0.110
PL07MH3 7	5	1.940	5	1.590	5	85.780	5	65.860	4	0.158	5	0.288
PL07MH1 7	5	2.030	5	1.930	5	74.060	5	80.880	5	0.640	5	0.295
PL07MH2 7	5	0.910	5	2.575	5	20.650	5	*	5	0.378	5	0.181
PL14MH1 14	4	1.040	4	2.190	4	43.880	4	71.470	5	0.140	5	0.234
PL14MH2 14	5	3.341	5	1.185	5	77.089	5	37.850	4	0.382	5	0.284
PL14MH3 14	5	2.951	5	0.415	5	87.555	5	65.747	5	0.251	5	0.347
PL28MH2 28	5	1.609	5	1.100	5	74.100	5	44.848	5	0.158	5	0.144
PL28MH3 28	5	0.373	5	1.307	5	26.420	5	73.951	4	0.239	4	0.405
PL28MH1 28	5	0.787	5	1.267	5	48.070	5	47.468	5	0.230	5	0.061
PL56MH1 56	5	3.130	5	1.118	5	60.315	5	31.495	5	0.115	5	0.226
PL56MH2 56	6	1.540	5	1.554	6	18.107	5	87.560	5	0.304	5	0.126
PL56MH3 56	5	2.521	5	0.642	5	74.821	5	27.470	5	0.086	5	0.094
METHYL ETHYL KETONE 3.0% 50°C												
PH01ML1 1	5	3.992	5	3.070	5	40.864	5	23.060	5	1.490	5	0.817
PH07ML1 7	5	2.740	5	2.777	5	38.470	5	31.440	5	0.257	5	0.362
PH14ML1 14	5	2.790	5	3.378	5	32.665	5	60.226	5	0.533	5	0.406
PH28ML1 28	5	4.558	5	8.136	5	39.687	5	71.235	5	0.452	5	1.090
PH56ML1 56	5	4.843	5	3.338	5	49.600	5	51.760	5	0.255	5	0.357

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
					METHYL ETHYL KETONE 3.0% 23°C							
PL01ML2 1	4	2.200	5	3.320	4	33.140	5	42.100	5	0.620	5	0.303
PL01ML3 1	5	3.570	5	5.670	5	26.570	5	*	5	1.030	5	0.710
PL01ML1 1	5	1.337	5	2.479	5	11.164	5	25.681	5	0.200	5	0.456
PL07ML1 7	5	6.724	5	5.234	5	61.995	5	27.395	5	0.382	5	0.168
PL07ML3 7	6	2.252	5	3.935	6	*	5	56.118	5	0.322	5	0.316
PL07ML2 7	5	4.040	5	3.502	5	37.743	5	*	5	0.569	5	0.377
PL14ML2 14	5	3.547	5	5.365	5	26.619	5	35.290	5	1.107	5	0.562
PL14ML3 14	5	1.827	5	2.887	5	25.590	5	35.657	5	0.156	5	0.374
PL14ML1 14	5	2.470	5	2.390	5	30.730	5	28.400	5	0.377	5	0.454
PL28ML3 28	5	2.210	5	1.503	5	26.124	5	14.296	5	0.222	5	0.271
PL28ML2 28	5	4.310	5	2.893	5	29.440	5	16.916	5	0.340	5	0.552
PL28ML1 28	5	4.461	5	1.269	5	43.899	5	22.176	5	0.349	5	0.407
PL56ML1 56	5	3.423	5	0.945	5	17.849	5	21.600	5	0.220	5	0.433
PL56ML3 56	5	2.973	5	2.602	5	17.200	5	12.846	5	0.270	5	0.658
PL56ML2 56	5	1.540	5	2.054	5	29.166	5	24.503	5	0.198	5	0.230
					METHYL ETHYL KETONE 13.0% 50°C							
PH01MM1 1	5	1.432	5	1.195	5	35.548	5	21.840	5	0.335	5	0.518
PH07MM1 7	5	2.183	5	3.444	5	27.300	5	57.030	5	0.288	5	0.365
PH14MM1 14	5	4.321	4	4.720	5	73.228	4	7.620	5	0.471	5	0.407
PH28MM1 28	5	1.293	5	2.455	5	32.816	5	62.518	5	0.140	5	0.131
PH56MM1 56	3	1.530	5	5.870	3	18.100	5	54.142	5	0.569	5	0.360
					METHYL ETHYL KETONE 13.0% 23°C							
PL01MM3 1	5	2.472	5	1.376	5	43.134	5	66.880	5	0.303	4	0.283
PL01MM2 1	5	1.137	5	1.683	5	24.094	5	32.617	5	0.438	5	0.245
PL01MM1 1	5	2.193	5	1.354	5	42.147	5	25.772	5	0.228	5	0.456
PL07MM1 7	5	1.700	5	3.005	5	48.430	5	67.490	5	0.472	5	0.447
PL07MM2 7	5	1.932	5	5.579	5	16.520	5	14.728	5	0.442	5	0.356
PL07MM3 7	5	4.330	5	2.230	5	*	5	42.282	5	0.718	5	0.409
PL14MM3 14	5	2.450	5	2.080	5	49.883	5	25.859	5	0.217	5	0.220
PL14MM1 14	5	4.194	5	0.846	5	69.346	5	27.430	5	0.642	5	0.567
PL14MM2 14	5	4.115	5	3.460	5	56.092	5	74.009	5	0.227	5	0.359
PL28MM2 28	5	5.670	5	3.963	5	74.850	5	65.022	5	0.310	5	0.160
PL28MM1 28	6	4.430	4	3.750	6	54.907	4	69.450	5	0.132	5	0.462
PL28MM3 28	5	1.812	5	2.456	5	28.598	5	46.880	5	0.214	5	0.302
PL56MM1 56	5	4.516	5	2.516	5	66.910	5	52.912	5	0.247	5	0.143
PL56MM2 56	5	3.456	5	3.353	5	36.370	5	12.452	5	0.228	5	0.341
PL56MM3 56	5	3.033	5	2.027	5	32.329	5	12.434	5	0.298	5	0.216

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
ASTM #2 OIL SATURATED 50°C												
PH010M1 1	5	2.712	5	2.500	5	26.272	5	35.222	5	0.434	5	0.735
PH070M1 7	5	3.340	5	1.682	5	37.012	5	36.378	5	0.607	5	0.559
PH140M1 14	5	1.712	5	2.696	5	20.221	5	29.548	5	1.418	5	1.221
PH280M1 28	5	3.446	5	1.078	5	35.999	5	21.067	5	0.300	5	0.600
PH560M1 56	5	1.727	5	2.971	5	15.360	5	14.577	5	0.110	5	0.623
ASTM #2 OIL SATURATED 23°C												
PL010M3 1	5	3.070	4	2.270	5	41.167	4	27.570	4	0.412	5	0.385
PL010M1 1	5	2.104	5	2.021	5	24.551	5	25.343	5	0.522	5	1.396
PL010M2 1	5	1.433	5	0.923	5	17.030	5	4.434	5	0.927	5	5.043
PL070M2 7	5	2.568	5	2.032	5	32.044	5	24.152	5	0.283	5	0.590
PL070M3 7	5	1.740	5	3.439	5	26.847	5	33.029	5	0.415	5	0.374
PL070M1 7	5	1.507	5	2.741	5	25.577	5	42.349	5	0.654	5	0.390
PL140M1 14	5	1.210	5	2.654	5	13.730	5	24.102	5	0.490	5	2.072
PL140M2 14	5	1.194	5	3.232	5	14.899	5	25.727	5	0.716	5	0.434
PL140M3 14	5	2.600	5	1.670	5	38.900	5	30.230	5	0.460	5	0.297
PL280M2 28	5	2.960	5	2.819	5	28.016	5	36.034	5	0.716	5	0.787
PL280M1 28	5	2.850	5	2.850	5	76.560	5	76.560	5	0.200	5	0.200
PL280M3 28	5	3.232	5	2.641	5	34.025	5	50.732	5	0.986	5	0.792
PL560M2 56	5	1.667	5	1.901	5	26.650	5	77.658	5	1.331	5	0.316
PL560M3 56	5	7.257	5	0.984	5	45.010	5	50.141	5	0.518	5	1.119
PL560M1 56	5	2.783	5	2.532	5	29.337	5	30.223	5	0.335	5	0.329
ASTM #2 OIL 100.0% 50°C												
PH010P1 1	5	3.260	5	0.867	5	39.499	5	9.367	5	0.357	5	0.303
PH070P1 7	5	1.196	5	5.000	5	18.687	5	52.000	5	0.220	5	0.470
PH140P1 14	4	9.540	5	3.293	4	76.500	5	41.007	4	0.430	4	0.210
PH280P1 28	5	1.824	5	6.556	5	27.230	5	80.902	5	0.438	5	0.716
PH560P1 56	5	6.925	5	0.776	5	51.700	5	12.029	5	0.648	5	1.060
ASTM #2 OIL 100.0% 23°C												
PL010P1 1	5	1.585	5	1.218	5	21.634	5	15.599	5	0.179	5	0.303
PL010P3 1	5	2.216	5	5.190	5	23.334	5	53.028	5	0.297	5	1.410
PL010P2 1	5	2.003	5	2.696	5	28.962	5	43.191	5	1.747	5	2.173
PL070P2 7	5	2.352	5	8.890	5	26.093	5	*	5	0.607	5	0.438
PL070P3 7	5	15.284	5	1.254	5	*	5	22.190	5	0.200	5	1.010
PL070P1 7	5	2.928	5	2.995	5	39.976	5	35.048	5	0.110	5	0.250
PL140P1 14	5	3.327	5	4.683	5	38.280	5	54.587	5	0.310	5	0.110
PL140P2 14	5	3.171	5	1.539	5	36.683	5	25.403	5	0.179	5	0.141
PL140P3 14	5	3.297	5	1.925	5	42.237	5	23.883	5	0.616	5	0.228
PL280P1 28	5	2.261	5	3.737	5	31.234	5	24.700	5	1.390	5	2.660
PL280P2 28	5	3.357	5	2.120	5	26.753	5	39.810	5	0.482	5	2.318
PL280P3 28	5	4.114	5	2.718	5	38.882	5	17.914	5	0.283	5	0.390
PL560P3 55	5	4.815	5	2.118	5	57.897	5	22.680	5	0.623	5	0.522
PL560P2 55	5	3.158	5	3.582	5	38.251	5	55.829	5	0.994	5	0.460
PL560P1 56	5	2.066	5	0.912	5	21.274	5	6.576	5	0.469	5	0.632

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
PHENOL 8.0% 50°C												
PH01PH1 1	5	2.716	5	7.236	5	24.650	5	55.483	5	0.215	5	0.263
PH07PH1 7	5	4.150	5	1.450	5	32.671	5	14.181	5	0.194	5	0.181
PH14PH1 14	3	1.690	4	1.428	3	22.020	4	9.400	5	0.298	5	0.219
PH28PH1 28	4	0.430	4	1.331	4	19.510	4	20.560	5	0.247	5	0.203
PH56PH1 56	5	5.149	5	2.328	5	49.682	5	26.977	5	0.870	5	0.238
PHENOL 8.0% 23°C												
PL01PH3 1	5	3.104	5	2.303	5	27.306	5	22.594	5	0.572	5	0.162
PL01PH1 1	5	1.889	5	3.151	5	21.734	5	30.984	5	0.170	5	0.208
PL01PH2 1	5	4.556	5	2.468	5	41.761	5	22.157	5	0.261	5	0.239
PL07PH2 7	5	2.540	5	1.110	5	24.000	5	15.800	5	0.280	5	0.220
PL07PH3 7	5	3.060	5	3.210	5	20.473	5	28.888	5	0.265	5	0.150
PL07PH1 7	5	5.346	5	2.609	5	46.030	5	21.882	5	0.139	4	0.157
PL14PH1 14	5	6.806	5	4.688	5	42.952	5	38.146	5	0.224	5	0.220
PL14PH3 14	5	1.562	5	3.866	5	12.889	5	27.432	5	0.375	4	0.409
PL14PH2 14	5	4.003	5	2.019	5	31.947	5	12.912	5	0.380	5	0.314
PL28PH3 28	4	0.375	5	1.995	4	7.200	5	18.784	5	0.101	5	1.100
PL28PH1 28	5	4.060	5	1.808	5	29.160	5	20.399	5	0.387	5	0.211
PL28PH2 28	3	4.300	5	1.676	3	27.260	5	17.173	5	0.277	5	0.443
PL56PH1 56	4	2.750	4	1.230	4	24.160	4	20.890	5	0.407	5	0.522
PL56PH2 56	3	4.880	4	2.330	3	37.120	4	26.280	5	0.304	5	0.421
PL56PH3 56	3	2.470	4	1.930	3	30.390	4	21.370	5	0.476	5	0.446
PHENOL 1.0% 50°C												
PH01PL1 1	5	10.052	5	1.504	5	75.648	5	10.754	5	0.109	5	0.171
PH07PL1 7	5	2.720	5	2.980	5	20.760	5	25.050	5	0.251	5	0.380
PH14PL1 14	5	1.889	5	0.804	5	18.998	5	10.232	5	0.329	5	0.249
PH28PL1 28	4	3.090	5	1.374	4	33.630	5	14.733	5	0.293	5	0.254
PH56PL1 56	5	0.331	5	1.664	5	23.209	5	13.386	5	0.256	5	0.478
PHENOL 1.0% 23°C												
PL01PL1 1	5	2.670	5	2.400	5	18.744	5	11.350	5	0.699	5	0.213
PL01PL3 1	5	2.607	5	3.246	5	14.094	5	30.813	5	0.471	5	0.234
PL01PL2 1	5	6.229	5	0.608	5	54.547	5	7.087	5	0.490	5	0.866
PL07PL2 7	5	2.220	5	9.860	5	18.916	5	85.673	5	0.225	5	0.373
PL07PL1 7	5	3.520	5	3.720	5	27.370	5	31.410	5	1.581	5	0.741
PL07PL3 7	5	2.500	5	0.660	5	23.760	5	6.886	5	0.250	4	0.420
PL14PL2 14	5	0.978	5	1.870	5	7.540	5	12.650	5	0.145	5	0.486
PL14PL1 14	5	3.045	5	1.954	5	27.099	5	17.775	5	0.203	5	0.504
PL14PL3 14	5	1.537	5	1.662	5	11.508	5	13.877	5	0.160	5	0.350
PL28PL2 28	5	1.823	5	1.588	5	17.259	5	23.933	5	0.247	5	0.188
PL28PL3 28	5	5.422	5	2.870	5	50.074	5	33.907	5	0.247	5	0.185
PL28PL1 28	5	4.603	5	0.779	5	34.976	5	40.688	5	0.269	5	0.348

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
PHENOL 1.0% 23°C												
PL56PL3 56	5	2.858	5	3.065	5	20.848	5	23.440	5	0.155	5	0.276
PL56PL1 56	5	3.370	5	0.995	5	33.360	5	21.673	5	0.293	5	0.537
PL56PL2 56	5	2.777	5	2.195	5	16.045	5	19.014	5	0.411	5	0.177
PHENOL 4.0% 50°C												
PH01PM1 1	5	5.065	5	2.366	5	40.501	5	21.708	5	0.319	5	0.149
PH07PM1 7	5	1.590	5	1.210	5	12.330	5	10.140	5	0.144	5	0.159
PH14PM1 14	5	4.364	5	2.125	5	31.599	5	16.598	5	0.211	5	0.273
PH28PM1 28	5	5.737	5	1.722	5	49.173	5	20.954	5	0.444	5	0.268
PH56PM1 56	5	1.053	5	2.864	5	19.041	5	17.736	5	0.363	5	0.290
PHENOL 4.0% 23°C												
PL01PM1 1	5	1.849	5	2.377	5	14.654	5	21.607	5	0.261	5	0.207
PL01PM2 1	5	1.846	5	1.579	5	18.390	5	12.572	5	1.580	5	0.221
PL01PM3 1	5	2.396	5	1.580	5	15.196	5	13.664	5	0.170	5	0.338
PL07PM1 7	5	2.320	5	3.320	5	18.286	5	29.350	5	0.522	5	0.429
PL07PM3 7	5	4.525	5	2.030	5	35.159	5	22.120	5	0.466	5	0.115
PL07PM2 7	5	3.493	5	2.030	5	33.480	5	15.500	5	0.144	5	0.256
PL14PM2 14	5	3.242	5	2.406	5	26.233	5	23.584	5	0.295	5	0.201
PL14PM1 14	5	1.180	5	3.733	5	16.502	5	31.265	5	0.483	5	0.449
PL14PM3 14	5	5.053	5	3.624	5	42.383	5	25.363	5	0.210	5	0.153
PL28PM2 28	5	1.771	5	2.366	5	18.862	5	16.250	5	0.129	5	0.346
PL28PM3 28	5	5.215	5	3.785	5	48.837	5	28.025	5	0.443	5	0.264
PL28PM1 28	5	3.858	5	2.420	5	31.723	5	21.966	5	0.189	5	0.159
PL56PM3 56	5	9.352	5	1.933	5	54.920	5	36.052	5	0.571	5	0.295
PL56PM2 56	5	5.988	5	3.556	5	59.672	5	18.292	5	0.335	5	0.326
PL56PM1 56	5	2.456	5	2.613	5	33.156	5	17.556	5	0.268	5	0.335
SODIUM CHLORIDE 35.0% 50°C												
PH01SH1 1	5	4.175	5	5.383	5	39.659	5	39.329	5	0.228	5	0.303
PH07SH1 7	5	5.391	4	2.160	5	78.490	4	23.450	5	0.475	5	0.187
PH14SH1 14	*	*	*	*	*	*	*	*	10	0.358	9	0.524
PH28SH1 28	5	3.189	5	1.808	5	31.391	5	13.399	10	0.274	10	0.403
PH56SH1 56	5	4.091	5	1.808	5	52.450	5	15.251	10	0.457	10	0.267
SODIUM CHLORIDE 35.0% 23°C												
PL01SH1 1	5	1.851	5	1.367	5	21.590	5	17.482	5	0.245	5	0.261
PL01SH2 1	5	2.308	5	1.702	5	47.527	5	20.899	5	0.280	5	0.170
PL01SH3 1	5	3.051	5	1.591	5	22.608	5	22.358	5	0.350	5	0.040
PL07SH1 7	5	2.629	5	3.472	5	26.120	5	18.300	5	0.200	5	0.260
PL07SH3 7	5	4.308	5	2.223	5	90.277	5	24.797	5	0.340	5	0.340
PL07SH2 7	5	1.226	5	3.267	5	24.500	5	40.611	5	0.299	5	0.498
PL14SH3 14	5	4.942	5	0.971	5	66.915	5	13.573	8	0.370	9	0.273
PL14SH2 14	5	2.048	*	*	5	25.993	*	*	10	0.346	8	0.466

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
SODIUM CHLORIDE 35.0% 23°C												
PL14SH1 14	*	*	*	*	*	*	*	*	10	0.820	10	0.545
PL28SH2 28	5	1.704	5	1.883	5	20.267	5	1.930	10	0.327	10	0.302
PL28SH3 28	5	2.216	5	2.792	5	17.252	5	29.143	10	0.271	10	0.437
PL28SH1 28	5	5.606	5	1.191	5	58.720	5	13.252	10	0.523	10	0.298
PL56SH3 56	5	4.470	4	6.780	5	20.300	4	34.560	5	0.400	5	0.360
PL56SH2 56	5	1.785	5	1.706	5	25.419	5	19.026	5	0.440	5	0.580
PL56SH1 56	5	2.003	5	0.658	5	19.903	5	13.627	9	0.316	10	0.405
SODIUM CHLORIDE 10.0% 50°C												
PH01SM1 1	5	4.740	5	1.643	5	45.334	5	22.514	5	0.460	5	0.316
PH07SM1 7	5	1.819	5	1.710	5	33.585	5	19.540	5	0.415	5	0.219
PH14SM1 14	5	1.630	5	1.250	5	20.810	5	13.560	5	0.300	5	0.430
PH28SM1 28	5	1.931	5	1.530	5	17.370	5	25.110	5	0.390	5	0.261
PH56SM1 61	5	3.260	5	1.940	5	21.240	5	25.900	5	0.360	5	0.261
SODIUM CHLORIDE 10.0% 23°C												
PL01SM1 1	5	1.370	5	2.360	5	13.360	5	41.530	5	0.360	5	0.350
PL01SM3 1	5	1.990	5	2.400	5	23.870	5	16.590	5	0.230	5	0.180
PL01SM2 1	5	2.280	5	3.040	5	23.470	5	38.770	5	0.385	5	0.261
PL07SM1 7	5	1.680	5	0.480	5	30.820	5	16.150	5	1.510	5	0.180
PL07SM3 7	5	3.030	5	1.730	5	46.290	5	36.810	5	0.440	5	0.360
PL07SM2 7	5	5.910	5	0.865	5	61.880	5	10.920	5	0.701	5	0.400
PL14SM1 14	5	1.950	5	1.960	5	20.500	5	22.300	5	0.370	5	0.490
PL14SM3 15	5	3.940	5	1.352	5	48.550	5	13.409	10	0.470	10	0.440
PL14SM2 15	5	2.870	5	1.213	5	25.900	5	5.561	10	0.620	10	0.501
PL28SM3 28	5	2.780	5	1.460	5	33.700	5	14.380	5	0.297	5	0.360
PL28SM2 28	5	1.770	5	2.892	5	18.960	5	18.322	5	0.385	5	0.460
PL28SM1 28	5	1.510	5	0.433	5	29.080	5	35.190	5	0.167	5	0.283
PL56SM3 56	4	3.340	5	1.126	4	31.100	5	14.670	5	0.228	5	0.416
PL56SM2 56	5	4.060	5	1.820	5	30.770	5	12.480	5	0.230	5	0.360
PL56SM1 61	5	3.337	5	5.626	5	49.930	5	55.850	5	0.540	5	0.790
WATER 100.0% 50°C												
PH01WP1 1	5	3.683	5	1.440	5	30.329	5	15.971	5	0.329	5	0.316
PH07WP1 7	5	1.798	5	1.990	5	10.465	5	16.750	5	0.460	5	0.240
PH14WP1 14	5	7.100	5	1.730	5	97.600	5	14.700	5	0.540	5	0.335
PH28WP1 28	5	7.394	5	2.182	5	72.510	5	19.990	5	0.228	5	0.167
PH56WP1 56	5	2.403	5	4.360	5	*	5	43.180	5	0.735	5	0.358
WATER 100.0% 23°C												
PL01WP1 1	5	3.380	5	0.817	5	5.370	5	5.840	5	0.261	5	0.555
PL01WP2 1	5	1.660	5	3.140	5	5.290	5	5.240	5	0.424	5	0.415
PL01WP3 1	5	2.013	5	3.060	5	5.583	5	5.410	5	0.110	5	0.167
PL07WP1 7	5	2.010	5	0.520	5	24.000	5	2.320	5	0.089	5	0.415

POLYVINYL CHLORIDE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
WATER 100.0% 23°C												
PL07WP3 7	5	2.360	5	2.480	5	17.890	5	98.120	5	0.660	5	0.385
PL07WP2 7	5	4.060	5	1.280	5	41.620	5	6.450	5	0.415	5	0.140
PL14WP3 14	5	1.750	5	3.350	5	18.550	5	41.510	5	0.245	5	0.245
PL14WP1 14	5	3.769	5	2.650	5	24.977	5	29.500	5	0.522	5	0.385
PL14WP2 14	5	1.630	5	1.350	5	17.330	5	18.360	5	0.415	5	0.200
PL28WP2 28	5	4.980	5	1.500	5	50.100	5	39.960	5	0.550	5	0.450
PL28WP3 28	5	3.500	5	0.450	5	88.280	5	23.780	5	1.500	5	0.450
PL28WP1 28	5	2.774	5	1.929	5	26.728	5	25.727	5	0.792	5	0.498
PL56WP1 56	5	2.900	5	3.110	5	44.200	5	25.160	5	0.573	5	0.170
PL56WP2 56	5	1.570	5	3.860	5	13.710	5	25.020	10	0.283	10	0.300
PL56WP3 56	5	4.090	5	0.720	5	30.910	5	39.700	10	0.440	9	0.430
POTASSIUM DICHROMATE 10.0% 50°C												
PH01XM1 1	2	0.280	5	2.230	2	18.500	5	22.070	4	0.570	8	0.380
PH07XM1 7	5	2.440	5	0.740	5	23.490	5	20.940	10	0.401	10	0.310
PH14XM1 14	5	3.730	5	3.080	5	26.180	5	33.000	10	0.650	10	0.430
PH28XM1 28	5	1.210	5	1.920	5	10.940	5	29.210	10	0.793	10	0.501
PH56XM1 56	5	2.800	5	1.460	5	20.720	5	22.800	8	0.614	6	0.303
POTASSIUM DICHROMATE 10.0% 23°C												
PL01XM3 1	5	2.910	5	3.240	5	38.920	5	48.390	10	0.710	10	0.721
PL01XM2 1	5	1.770	5	3.120	5	8.250	5	33.510	10	0.530	10	0.464
PL01XM1 1	5	2.960	5	2.101	5	48.360	5	33.390	9	0.561	10	0.690
PL07XM3 7	5	1.433	5	0.841	5	13.614	5	11.992	10	0.518	10	2.670
PL07XM1 7	5	2.455	5	1.671	5	42.518	5	24.328	10	0.519	10	0.415
PL07XM2 7	5	3.565	5	1.895	5	37.153	5	16.122	10	0.358	10	0.583
PL14XM1 14	5	1.942	5	2.904	5	8.442	5	25.527	10	0.479	10	0.755
PL14XM3 14	5	0.585	5	5.430	5	96.200	5	34.920	10	0.341	10	0.379
PL14XM2 14	5	0.887	5	3.030	5	11.270	5	32.130	10	0.358	9	0.350
PL28XM2 28	5	1.760	5	2.840	5	29.500	5	33.680	10	0.300	10	0.420
PL28XM1 28	5	3.600	5	2.150	5	35.600	5	29.960	10	0.330	10	0.340
PL28XM3 28	5	2.530	5	1.501	5	40.380	5	25.560	10	0.405	10	0.780
PL56XM3 56	5	2.780	5	2.320	5	30.570	5	20.000	10	0.220	10	0.231
PL56XM2 56	5	2.590	5	3.110	5	28.899	5	52.310	10	0.391	10	0.366
PL56XM1 56	5	1.580	5	2.580	5	30.820	5	25.840	8	0.141	10	0.481

PVC : RETENTION OF PROPERTIES

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
HYDROCHLORIC ACID 10.0% 50°C											
PH01AM1 1	1.0	2.3	2.4	99	93	100	92	95	94	98	90
PH07AM1 7	2.4	1.6	3.3	86	87	96	89	107	101	101	99
PH14AM1 14	5.1	2.9	7.3	99	102	101	99	101	101	107	104
PH99AM1 28	5.1	3.8	7.2	*	*	*	*	*	*	*	*
PH28AM1 29	5.9	3.4	9.2	109	116	101	97	82	74	114	116
PH56AM1 56	8.5	7.0	15.7	101	105	100	95	91	83	101	101
PH99AM2 144	15.0	8.2	20.6	*	*	*	*	*	*	*	*
PH99AM3 252	22.9	11.7	31.9	*	*	*	*	*	*	*	*
PH99AM4 368	25.9	12.3	33.7	*	*	*	*	*	*	*	*
PH99AM5 511	30.7	13.0	36.3	*	*	*	*	*	*	*	*
PH99AM6 621	32.3	13.6	39.5	*	*	*	*	*	*	*	*
PH99AM7 733	34.0	14.9	43.5	122	*	101	*	88	*	*	*
HYDROCHLORIC ACID 10.0% 23°C											
PL01AM2 1	.3	1.3	1.9	93	89	96	95	94	102	96	94
PL01AM1 1	.3	.3	.2	90	92	89	92	83	93	95	92
PL01AM3 1	.4	.3	*	92	95	95	95	93	99	94	94
PL07AM1 7	.5	.6	.6	83	83	90	91	96	101	104	94
PL07AM3 7	.6	.3	*	84	83	94	92	102	105	108	99
PL07AM2 7	.6	*	.6	84	89	94	90	98	95	99	104
PL14AM3 14	1.4	.6	.9	95	101	99	100	95	104	106	103
PL14AM1 14	1.1	1.3	1.8	98	97	104	96	108	98	110	102
PL14AM2 14	1.1	.9	1.1	97	96	103	100	107	105	107	109
PL99AM1 28	.4	*	.2	*	*	*	*	*	*	*	*
PL28AM1 29	.7	.6	1.0	102	102	106	98	96	94	105	94
PL28AM2 29	1.1	1.0	1.9	99	103	105	98	103	89	98	102
PL28AM3 29	.9	1.3	2.0	102	102	103	97	95	91	102	94
PL56AM1 56	.9	1.9	3.1	97	94	103	97	96	95	106	107
PL56AM3 56	.4	2.2	3.0	102	98	105	97	96	91	107	103
PL56AM2 56	1.0	2.2	3.2	104	95	101	97	87	96	107	102
PL99AM2 144	1.4	.6	1.3	*	*	*	*	*	*	*	*
PL99AM3 238	1.8	.9	3.2	*	*	*	*	*	*	*	*
PL99AM4 368	2.3	1.9	3.8	*	*	*	*	*	*	*	*
PL99AM5 538	3.2	.9	3.0	*	*	*	*	*	*	*	*
PL99AM6 621	3.5	1.6	4.5	*	*	*	*	*	*	*	*
PL99AM7 735	4.0	2.5	5.7	100	*	102	*	98	*	*	*
SODIUM HYDROXIDE 10.0% 50°C											
PH01BM1 1	.6	*	.1	79	100	92	107	114	109	102	109
PH07BM1 7	9.4	.6	8.4	117	137	107	106	107	108	135	140
PH14BM1 14	11.0	2.2	11.3	141	151	105	105	89	84	217	205
PH28BM1 28	15.0	3.8	16.8	158	169	110	120	63	64	215	225
PH99BM1 29	100.0	1.9	12.5	*	*	*	*	*	*	*	*
PH56BM1 56	16.8	1.6	16.0	167	170	125	126	93	87	292	282
PH99BM2 144	19.5	4.8	12.5	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
SODIUM HYDROXIDE 10.0% 50°C											
PH99BM3 252	20.1	6.7	23.3	*	*	*	*	*	*	*	*
PH99BM4 368	20.7	6.1	23.6	*	*	*	*	*	*	*	*
PH99BM5 510	20.4	7.3	25.3	*	*	*	*	*	*	*	*
PH99BM6 622	22.2	13.4	9.0	*	*	*	*	*	*	*	*
PH99BM7 733	22.7	5.1	24.2	*	*	139	*	2	*	*	*
SODIUM HYDROXIDE 10.0% 23°C											
PL01BM3 1	.2	*	.3	83	85	101	97	113	117	106	107
PL01BM1 1	*	.3	.3	87	97	94	102	111	100	96	101
PL01BM2 1	.1	.3	.1	83	85	102	95	117	109	108	108
PL07BM3 7	.4	*	.1	94	98	103	100	109	112	104	101
PL07BM2 7	.4	*	.2	97	97	104	101	111	115	104	100
PL07BM1 7	.4	.3	*	89	87	107	98	129	123	100	97
PL14BM2 14	.8	*	.7	78	79	99	93	119	118	96	95
PL14BM1 14	.6	.6	1.1	100	95	101	98	95	102	110	100
PL14BM3 14	.9	.3	1.5	81	77	98	91	112	113	99	92
PL28BM2 28	2.4	*	1.5	79	105	90	108	107	106	104	110
PL99BM1 28	1.3	.3	1.1	*	*	*	*	*	*	*	*
PL28BM1 28	2.2	*	1.9	93	95	100	96	104	107	108	102
PL28BM3 32	2.6	*	1.5	82	109	91	108	108	103	107	111
PL56BM3 56	8.4	1.0	8.1	133	136	110	105	107	101	156	159
PL56BM1 56	7.7	1.3	8.0	120	128	105	104	97	105	143	157
PL56BM2 56	9.0	1.3	8.2	120	139	102	105	106	96	150	147
PL99BM2 144	13.4	1.6	12.1	*	*	*	*	*	*	*	*
PL99BM3 238	16.6	3.5	9.6	*	*	*	*	*	*	*	*
PL99BM4 368	17.6	4.1	16.7	*	*	*	*	*	*	*	*
PL99BM5 510	18.0	7.6	21.1	*	*	*	*	*	*	*	*
PL99BM6 622	18.9	.9	15.8	*	*	*	*	*	*	*	*
PL99BM7 735	19.1	2.5	17.5	172	*	155	*	29	*	*	*
1 2 DICHLOROETHANE .8% 50°C											
PH01DH1 1	18.8	5.4	13.1	41	43	71	72	111	116	63	58
PH07DH1 7	14.6	5.8	16.6	44	50	64	72	102	115	83	77
PH14DH1 14	11.9	5.4	11.1	57	66	79	80	112	104	61	57
PH99DH1 28	16.8	2.5	5.5	*	*	*	*	*	*	*	*
PH28DH1 29	17.0	5.1	11.8	45	48	71	69	112	110	69	60
PH56DH1 56	6.8	4.2	5.8	62	64	81	81	104	107	85	85
PH99DH2 133	3.1	1.6	2.7	*	*	*	*	*	*	*	*
PH99DH3 244	20.5	3.2	6.5	*	*	*	*	*	*	*	*
PH99DH4 364	6.6	3.5	6.4	*	*	*	*	*	*	*	*
PH99DH5 495	8.2	3.8	8.0	*	*	*	*	*	*	*	*
PH99DH6 629	.5	*	.3	*	*	*	*	*	*	*	*
PH99DH7 726	14.3	5.0	11.6	69	*	74	*	83	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				1 2 DICHLOROETHANE .8% 23°C							
PL01DH3 1	13.3	4.1	10.5	52	54	77	78	114	110	61	56
PL01DH2 1	14.0	3.8	9.8	38	42	67	72	113	118	63	57
PL01DH1 1	12.7	3.2	9.0	51	50	80	78	113	114	69	64
PL07DH1 7	10.5	4.1	9.7	38	41	69	70	119	120	88	83
PL07DH2 7	7.1	2.5	7.0	52	54	71	77	106	114	69	63
PL07DH3 7	13.9	3.2	8.5	41	43	66	70	113	120	75	69
PL14DH2 14	13.1	4.1	9.0	67	74	86	90	112	107	65	66
PL14DH1 14	15.9	4.5	12.8	56	50	79	74	109	114	61	55
PL14DH3 14	11.7	2.9	6.1	62	64	84	82	109	111	67	75
PL28DH2 28	18.2	4.2	12.6	*	*	*	*	*	*	72	71
PL28DH3 28	10.7	3.5	8.3	*	*	*	*	*	*	69	61
PL99DH1 28	5.7	1.6	5.2	*	*	*	*	*	*	*	*
PL28DH1 29	15.0	4.8	13.4	51	47	73	70	110	114	58	54
PL56DH1 56	8.5	3.5	6.7	43	44	69	67	108	105	66	63
PL56DH2 56	11.6	3.5	7.9	63	66	77	75	103	101	86	80
PL56DH3 56	13.1	4.1	9.5	66	63	81	75	107	104	94	87
PL99DH2 134	10.9	1.6	5.7	*	*	*	*	*	*	*	*
PL99DH3 231	8.7	2.9	12.0	*	*	*	*	*	*	*	*
PL99DH4 364	9.6	2.6	8.5	*	*	*	*	*	*	*	*
PL99DH5 495	5.5	1.3	3.5	*	*	*	*	*	*	*	*
PL99DH6 630	13.1	5.8	11.9	*	*	*	*	*	*	*	*
PL99DH7 728	13.7	3.5	9.5	53	*	78	*	120	*	*	*
				1 2 DICHLOROETHANE .1% 50°C							
PH01DL1 1	2.0	1.9	1.8	71	72	90	89	106	109	91	88
PH07DL1 7	2.1	1.9	2.9	74	78	92	90	111	109	95	89
PH14DL1 14	3.1	1.9	2.1	70	73	89	88	110	111	87	80
PH99DL1 28	2.4	2.5	3.0	*	*	*	*	*	*	*	*
PH28DL1 29	2.9	2.3	2.3	68	69	87	86	112	114	86	88
PH56DL1 56	4.1	2.5	4.2	60	64	78	79	105	106	82	82
PH99DL2 139	2.5	1.6	2.3	*	*	*	*	*	*	*	*
PH99DL3 246	3.7	1.9	3.5	*	*	*	*	*	*	*	*
PH99DL4 366	2.9	2.2	3.7	*	*	*	*	*	*	*	*
PH99DL5 496	2.9	1.6	2.8	*	*	*	*	*	*	*	*
PH99DL6 631	2.9	1.9	3.1	*	*	*	*	*	*	*	*
PH99DL7 728	3.0	2.2	3.9	101	*	99	*	108	*	*	*
				1 2 DICHLOROETHANE .1% 23°C							
PL01DL3 1	1.8	.3	1.0	76	76	97	93	115	117	93	87
PL01DL2 1	1.6	.6	1.4	65	65	92	89	115	120	90	77
PL01DL1 1	1.8	.3	1.0	70	70	92	89	109	111	96	83
PL07DL1 7	2.6	1.3	2.4	70	68	91	88	110	116	89	83
PL07DL2 7	3.0	1.0	2.4	64	62	87	86	116	122	85	83
PL07DL3 7	3.3	.9	2.6	65	65	91	87	118	120	88	82
PL14DL1 14	2.9	1.0	2.6	66	65	86	87	105	114	84	74
PL14DL2 14	3.4	1.0	2.1	65	65	91	87	115	115	92	88
PL14DL3 14	3.4	1.3	2.7	64	62	89	84	109	112	79	82

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
1 2 DICHLOROETHANE .1% 23°C											
PL28DL3 28	2.0	1.0	1.7	*	*	*	*	*	*	99	91
PL99DL1 28	1.1	.6	1.0	*	*	*	*	*	*	*	*
PL28DL2 28	2.0	1.0	1.6	*	*	*	*	*	*	91	90
PL28DL1 29	2.3	.9	1.8	65	67	89	89	112	116	91	84
PL56DL2 56	1.0	.6	.8	67	68	84	84	104	110	95	90
PL56DL3 56	1.4	1.3	1.8	62	68	86	84	117	117	93	84
PL56DL1 56	3.6	.3	2.5	75	75	92	90	102	101	90	86
PL99DL2 136	2.0	.6	1.2	*	*	*	*	*	*	*	*
PL99DL3 233	1.9	1.0	2.5	*	*	*	*	*	*	*	*
PL99DL4 366	2.0	1.3	1.8	*	*	*	*	*	*	*	*
PL99DL5 496	1.2	.6	1.2	*	*	*	*	*	*	*	*
PL99DL6 632	1.7	1.0	1.7	*	*	*	*	*	*	*	*
PL99DL7 730	1.0	1.6	2.6	95	*	98	*	99	*	*	*
1 2 DICHLOROETHANE .5% 50°C											
PH01DM1 1	9.2	2.5	6.9	53	56	78	79	108	111	73	73
PH07DM1 7	6.6	2.6	5.1	49	52	75	71	115	107	80	76
PH14DM1 14	8.0	3.5	6.6	54	58	76	77	106	107	83	69
PH99DM1 28	6.1	1.9	4.9	*	*	*	*	*	*	*	*
PH28DM1 29	7.2	3.2	5.1	55	58	75	74	107	107	75	71
PH56DM1 56	6.2	3.5	5.2	63	65	81	82	107	110	89	87
PH99DM3 245	6.6	1.9	5.1	*	*	*	*	*	*	*	*
PH99DM4 365	3.4	1.9	4.0	*	*	*	*	*	*	*	*
PH99DM5 496	4.0	1.9	4.4	*	*	*	*	*	*	*	*
PH99DM6 630	3.9	2.2	4.6	*	*	*	*	*	*	*	*
PH99DM7 727	4.6	2.2	5.2	88	*	91	*	107	*	*	*
1 2 DICHLOROETHANE .5% 23°C											
PL01DM3 1	9.2	2.2	5.8	53	51	83	78	116	117	60	57
PL01DM2 1	8.3	2.2	6.3	55	54	83	81	115	120	67	70
PL01DM1 1	9.5	2.2	7.7	58	53	83	81	105	111	69	62
PL07DM2 7	7.1	1.9	5.7	53	54	81	73	112	107	75	72
PL07DM3 7	4.7	1.6	4.1	59	60	82	82	112	119	84	77
PL07DM1 7	9.3	2.9	6.9	44	47	71	73	111	117	82	76
PL14DM3 14	5.7	1.9	5.7	52	58	81	85	113	120	86	83
PL14DM2 14	8.0	2.6	6.6	48	47	79	75	118	118	75	74
PL14DM1 14	8.3	3.2	9.3	56	52	81	77	112	112	66	60
PL99DM1 28	7.5	1.9	6.1	*	*	*	*	*	*	*	*
PL28DM2 28	8.8	3.5	7.5	*	*	*	*	*	*	78	72
PL28DM3 28	9.1	3.2	7.1	*	*	*	*	*	*	69	68
PL28DM1 29	9.5	3.2	8.3	48	50	72	74	110	115	70	64
PL56DM1 56	2.6	1.9	2.3	58	57	80	80	101	108	80	74
PL56DM3 56	8.4	2.8	5.8	63	64	82	80	108	109	86	79
PL56DM2 56	5.8	2.5	4.7	63	67	81	81	108	109	92	84
PL99DM2 135	3.8	.9	3.2	*	*	*	*	*	*	*	*
PL99DM3 233	6.9	2.5	7.9	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
FURFURAL 8.0% 50°C											
PL99DM4 365	2.6	1.6	3.1	*	*	*	*	*	*	*	*
PL99DM5 496	5.9	1.9	5.2	*	*	*	*	*	*	*	*
PL99DM6 631	6.5	2.2	5.6	*	*	*	*	*	*	*	*
PL99DM7 729	10.6	3.8	10.0	61	*	83	*	114	*	*	*
PH01FH1 1	3.6	1.9	3.2	35	34	44	44	107	113	53	59
PH07FH1 7	61.0	18.4	59.9	8	10	22	21	114	106	22	18
PH14FH1 14	41.0	12.9	40.3	12	12	28	27	126	122	25	24
PH28FH1 28	46.1	15.8	45.2	10	10	27	24	141	133	23	20
PH99FH1 28	48.7	14.2	44.5	*	*	*	*	*	*	*	*
PH56FH1 56	48.5	15.8	48.2	13	11	27	25	124	106	20	20
PH99FH2 117	43.4	14.8	44.4	*	*	*	*	*	*	*	*
PH99FH3 236	74.0	17.9	62.8	*	*	*	*	*	*	*	*
PH99FH4 350	72.8	21.4	73.9	*	*	*	*	*	*	*	*
PH99FH5 485	58.9	19.8	64.9	*	*	*	*	*	*	*	*
PH99FH6 616	77.6	24.8	81.5	*	*	*	*	*	*	*	*
PH99FH7 713	86.0	25.2	90.3	25	*	34	*	79	*	*	*
FURFURAL 8.0% 23°C											
PL01FH3 1	25.2	12.2	39.3	11	12	26	22	124	115	32	30
PL01FH2 1	29.3	13.5	42.2	11	11	22	22	117	121	28	29
PL01FH1 1	1.6	.6	1.9	75	78	91	91	103	110	61	66
PL07FH2 7	42.5	13.2	42.7	13	14	23	23	102	172	24	23
PL07FH3 7	42.9	13.1	43.1	13	15	26	27	117	121	26	24
PL07FH1 7	44.1	13.9	48.9	12	14	24	25	110	121	25	23
PL14FH1 14	39.8	11.8	37.0	14	10	24	22	110	116	22	22
PL14FH3 14	40.5	13.5	41.1	12	14	24	25	112	123	21	22
PL14FH2 14	43.3	14.6	43.6	12	14	24	21	114	105	22	20
PL28FH1 28	50.7	14.9	47.0	12	11	25	23	138	129	23	23
PL28FH3 28	53.6	15.7	38.0	11	11	24	23	115	123	20	23
PL99FH1 28	49.7	14.0	45.3	*	*	*	*	*	*	*	*
PL28FH2 28	6.3	15.3	49.6	10	11	24	24	110	130	22	23
PL56FH1 56	47.5	15.4	45.9	10	12	22	22	140	130	22	23
PL56FH2 56	58.0	17.5	55.5	11	11	24	22	119	114	21	20
PL56FH3 56	56.1	16.8	54.4	11	11	24	23	123	122	20	20
PL99FH2 117	53.4	25.5	67.7	*	*	*	*	*	*	*	*
PL99FH3 219	50.3	16.6	61.1	*	*	*	*	*	*	*	*
PL99FH4 350	67.8	19.1	67.6	*	*	*	*	*	*	*	*
PL99FH5 485	51.1	17.2	58.8	*	*	*	*	*	*	*	*
PL99FH6 617	90.8	25.8	94.5	*	*	*	*	*	*	*	*
PL99FH7 715	91.8	25.5	96.3	14	*	25	*	87	*	*	*
FURFURAL 1.0% 50°C											
PH01FL1 1	3.2	1.9	3.0	64	64	85	84	104	107	99	85
PH07FL1 7	3.8	2.2	2.9	48	51	79	77	127	125	80	76
PH14FL1 14	4.2	1.9	3.8	64	65	86	81	109	105	84	77
PH28FL1 28	4.6	1.9	3.3	63	65	80	83	106	117	87	86
PH99FL1 28	4.1	1.6	3.4	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				FURFURAL 1.0% 50°C							
PH56FL1 56	4.7	2.6	4.5	65	66	86	84	118	118	94	84
PH99FL2 123	4.2	1.2	3.9	*	*	*	*	*	*	*	*
PH99FL3 241	6.8	1.9	5.4	*	*	*	*	*	*	*	*
PH99FL4 355	6.4	.9	5.0	*	*	*	*	*	*	*	*
PH99FL5 488	6.0	2.2	5.7	*	*	*	*	*	*	*	*
PH99FL6 621	6.7	.9	2.9	*	*	*	*	*	*	*	*
PH99FL7 718	6.4	2.5	6.4	84	*	90	*	97	*	*	*
				FURFURAL 1.0% 23°C							
PL01FL2 1	1.5	.3	1.2	70	83	83	93	101	94	98	122
PL01FL3 1	1.6	.6	1.3	68	81	82	92	101	90	100	119
PL01FL1 1	1.8	*	.4	74	72	87	88	96	107	111	123
PL07FL2 7	3.0	.3	1.6	47	46	85	83	127	130	82	78
PL07FL3 7	3.3	1.6	2.8	42	44	77	75	124	125	78	66
PL07FL1 7	3.0	1.0	2.2	46	43	81	76	124	126	80	72
PL14FL3 14	2.9	1.0	2.2	56	59	87	86	116	120	90	82
PL14FL2 14	3.3	1.0	2.3	53	57	87	88	133	138	87	80
PL14FL1 14	3.2	1.3	2.8	55	59	86	86	114	116	88	77
PL28FL2 28	3.4	1.3	2.9	62	65	90	90	120	121	91	87
PL28FL3 28	3.7	1.9	3.4	60	60	85	85	113	117	90	81
PL99FL1 28	2.5	.3	1.1	*	*	*	*	*	*	*	*
PL28FL1 28	3.3	1.0	2.5	61	60	85	85	122	130	84	83
PL56FL3 56	3.7	2.6	4.2	58	59	87	84	119	125	78	76
PL56FL2 56	3.8	2.3	3.7	62	65	90	89	121	124	86	80
PL56FL1 56	4.1	1.6	3.7	61	59	82	83	112	122	86	80
PL99FL2 123	2.7	.3	2.2	*	*	*	*	*	*	*	*
PL99FL3 224	4.3	.9	4.1	*	*	*	*	*	*	*	*
PL99FL4 355	5.2	1.3	4.7	*	*	*	*	*	*	*	*
PL99FL5 488	4.5	.9	2.8	*	*	*	*	*	*	*	*
PL99FL6 622	5.0	.6	3.1	*	*	*	*	*	*	*	*
PL99FL7 720	4.9	1.6	4.8	71	*	84	*	106	*	*	*
				FURFURAL 4.0% 50°C							
PH01FM1 1	13.9	4.1	10.3	30	31	46	43	98	93	32	33
PH07FM1 7	14.3	4.8	12.9	31	33	51	56	106	119	61	53
PH14FM1 14	14.8	5.1	14.7	29	30	51	51	109	113	53	50
PH28FM1 28	14.8	4.8	13.1	28	31	51	56	118	121	47	48
PH99FM1 28	14.1	4.1	12.1	*	*	*	*	*	*	*	*
PH56FM1 56	15.9	6.1	15.5	34	35	57	57	130	116	54	49
PH99FM2 123	13.3	4.1	12.1	*	*	*	*	*	*	*	*
PH99FM3 241	21.3	6.0	18.3	*	*	*	*	*	*	*	*
PH99FM4 355	19.9	6.3	19.7	*	*	*	*	*	*	*	*
PH99FM5 489	17.6	5.7	15.5	*	*	*	*	*	*	*	*
PH99FM6 621	21.1	7.5	18.2	*	*	*	*	*	*	*	*
PH99FM7 718	18.9	6.9	19.1	47	*	56	*	76	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
FURFURAL 4.0% 23°C											
PL01FM1 1	12.5	3.5	100.0	29	28	47	44	99	99	61	74
PL01FM3 1	5.8	3.2	10.1	28	28	55	51	118	114	65	67
PL01FM2 1	6.1	3.5	11.0	26	27	53	52	121	118	66	57
PL07FM1 7	13.5	4.5	13.4	28	31	53	56	120	129	60	52
PL07FM2 7	14.1	4.2	12.9	34	35	56	55	103	109	55	51
PL07FM3 7	13.3	4.5	12.6	37	37	64	57	112	103	65	58
PL14FM1 14	14.8	4.7	14.7	29	28	52	49	113	111	50	51
PL14FM2 14	13.0	3.9	12.0	31	31	56	53	117	116	49	44
PL14FM3 14	11.9	4.1	12.0	32	31	55	54	114	113	49	45
PL28FM1 28	14.4	4.7	13.0	30	28	51	50	120	123	43	43
PL99FM1 28	13.3	3.4	10.2	*	*	*	*	*	*	*	*
PL28FM3 28	13.8	4.2	10.9	29	29	51	53	118	131	45	43
PL28FM2 28	14.3	4.8	12.4	26	28	52	54	131	141	45	42
PL56FM2 56	14.6	5.2	13.6	31	31	53	51	125	120	47	44
PL56FM3 56	14.5	5.5	13.9	31	33	54	59	119	130	48	45
PL56FM1 56	15.3	5.5	14.1	32	27	53	52	117	142	46	43
PL99FM2 123	10.7	2.8	9.0	*	*	*	*	*	*	*	*
PL99FM3 227	16.1	4.4	16.3	*	*	*	*	*	*	*	*
PL99FM4 355	19.1	5.0	17.7	*	*	*	*	*	*	*	*
PL99FM5 489	18.2	4.7	15.7	*	*	*	*	*	*	*	*
PL99FM6 622	18.3	5.3	6.6	*	*	*	*	*	*	*	*
PL99FM7 720	17.7	5.3	17.0	36	*	50	*	93	*	*	*
METHYL ETHYL KETONE 26.0% 50°C											
PH01MH1 1	38.6	21.3	57.7	8	8	24	24	124	127	22	25
PH07MH1 7	36.8	21.0	42.5	7	7	17	20	105	115	76	75
PH14MH1 14	52.3	32.3	97.7	35	31	61	57	121	115	66	62
PH28MH1 28	32.6	23.1	42.4	2	3	9	10	104	97	10	12
PH99MH1 29	10.4	.9	12.7	*	*	*	*	*	*	*	*
PH56MH1 56	45.8	25.5	57.0	5	5	16	15	101	93	21	22
PH99MH2 122	12.6	.9	17.3	*	*	*	*	*	*	*	*
PH99MH3 240	.7	.6	18.5	*	*	*	*	*	*	*	*
PH99MH4 358	.6	6.3	1.6	*	*	*	*	*	*	*	*
PH99MH5 494	20.3	2.8	26.1	*	*	*	*	*	*	*	*
PH99MH6 626	6.8	1.3	16.9	*	*	*	*	*	*	*	*
PH99MH7 722	10.3	.9	19.2	*	*	131	*	6	*	*	*
METHYL ETHYL KETONE 26.0% 23°C											
PL01MH1 1	22.1	12.9	33.7	20	19	40	39	120	134	34	37
PL01MH3 1	134.4	38.9	144.6	*	2	*	4	16	41	10	9
PL01MH2 1	86.1	26.8	65.8	4	3	15	9	110	82	16	14
PL07MH2 7	37.7	29.7	73.1	3	3	9	9	81	82	23	22
PL07MH1 7	66.8	29.6	94.9	6	5	14	16	91	113	39	24
PL07MH3 7	76.7	32.8	112.4	4	5	14	13	110	100	32	35
PL14MH2 14	53.4	28.7	79.9	7	6	24	24	121	138	24	23
PL14MH1 14	61.1	26.8	88.5	8	12	26	28	119	121	21	27
PL14MH3 14	51.0	28.0	86.5	8	10	30	30	132	123	21	24

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
METHYL ETHYL KETONE 26.0% 23°C											
PL28MH3 28	49.2	28.6	72.0	3	2	8	8	72	85	11	15
PL99MH1 28	39.6	17.8	45.2	*	*	*	*	*	*	*	*
PL28MH2 28	66.4	30.9	94.8	3	3	7	7	61	70	11	9
PL28MH1 28	57.4	26.4	81.4	3	3	6	5	58	57	11	8
PL56MH2 56	62.0	25.6	76.0	9	7	24	22	124	117	22	20
PL56MH1 56	43.3	17.7	49.8	8	7	21	19	107	102	19	20
PL56MH3 56	77.7	25.6	87.5	5	4	7	9	46	70	14	14
PL99MH2 121	22.8	12.4	15.5	*	*	*	*	*	*	*	*
PL99MH3 235	8.6	14.3	35.7	*	*	*	*	*	*	*	*
PL99MH4 358	59.9	18.7	55.0	*	*	*	*	*	*	*	*
PL99MH5 494	93.3	25.1	78.3	*	*	*	*	*	*	*	*
PL99MH6 627	53.4	9.2	14.0	*	*	*	*	*	*	*	*
PL99MH7 724	42.0	16.2	36.0	6	*	20	*	108	*	*	*
METHYL ETHYL KETONE 3.0% 50°C											
PH01ML1 1	3.9	3.5	4.6	53	52	78	77	108	116	79	83
PH07ML1 7	7.0	2.9	8.2	41	43	63	60	109	105	74	66
PH14ML1 14	4.9	2.9	5.3	55	56	68	69	98	103	92	84
PH28ML1 28	5.0	3.1	5.6	63	60	74	71	96	99	98	90
PH99ML1 28	4.4	1.9	4.1	*	*	*	*	*	*	*	*
PH56ML1 56	4.1	2.2	4.1	66	68	81	78	105	103	96	93
PH99ML2 120	9.8	5.3	10.0	*	*	*	*	*	*	*	*
PH99ML3 240	11.2	5.6	11.1	*	*	*	*	*	*	*	*
PH99ML4 358	11.9	5.9	12.0	*	*	*	*	*	*	*	*
PH99ML5 493	9.7	5.6	9.9	*	*	*	*	*	*	*	*
PH99ML6 626	9.9	5.6	9.9	*	*	*	*	*	*	*	*
PH99ML7 722	10.4	6.3	11.4	60	*	85	*	114	*	*	*
METHYL ETHYL KETONE 3.0% 23°C											
PL01ML3 1	3.1	1.0	3.7	48	46	81	72	128	112	102	92
PL01ML2 1	3.4	.6	3.5	50	53	80	79	126	125	92	97
PL01ML1 1	3.2	1.0	4.2	46	44	76	75	119	125	75	78
PL07ML3 7	4.8	1.9	5.1	57	58	81	77	103	110	103	90
PL07ML1 7	5.0	1.9	5.5	48	46	72	70	104	109	89	78
PL07ML2 7	4.6	1.3	4.5	59	56	79	80	102	130	98	91
PL14ML1 14	3.6	1.6	4.3	39	39	60	62	108	119	73	70
PL14ML2 14	3.6	1.9	5.0	33	28	56	49	114	116	51	41
PL14ML3 14	3.6	1.6	4.5	37	36	62	58	122	120	74	71
PL28ML3 28	2.9	1.6	3.3	75	74	90	87	105	111	91	91
PL28ML2 28	2.6	1.3	3.1	67	70	83	86	106	107	99	96
PL28ML1 28	3.8	1.6	3.2	57	61	78	78	106	111	88	81
PL99ML1 28	3.2	1.6	3.6	*	*	*	*	*	*	*	*
PL56ML1 56	3.5	1.3	3.4	64	62	82	82	106	119	89	88
PL56ML2 56	3.9	1.9	4.7	58	59	78	76	109	110	92	81
PL56ML3 56	4.1	2.5	6.8	55	53	75	75	104	114	88	79
PL99ML2 120	4.3	1.3	4.4	*	*	*	*	*	*	*	*
PL99ML3 235	3.9	1.9	6.1	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
METHYL ETHYL KETONE 3.0% 23°C											
PL99ML4 358	5.0	1.9	5.9	*	*	*	*	*	*	*	*
PL99ML5 494	2.7	.9	2.5	*	*	*	*	*	*	*	*
PL99ML6 627	4.0	1.3	4.0	*	*	*	*	*	*	*	*
PL99ML7 724	4.5	2.2	5.6	65	*	88	*	107	*	*	*
METHYL ETHYL KETONE 13.0% 50°C											
PH01MM1 1	18.4	13.1	27.9	14	13	35	34	123	129	30	33
PH07MM1 7	39.8	19.1	51.9	16	16	34	36	98	104	50	52
PH14MM1 14	10.2	8.3	13.0	25	29	49	56	115	115	67	74
PH99MM1 28	22.1	10.5	28.7	*	*	*	*	*	*	*	*
PH28MM1 28	36.9	18.2	46.5	13	12	30	27	108	98	20	21
PH56MM1 56	2.9	9.8	8.5	47	49	76	72	122	110	71	66
PH99MM2 120	28.8	12.4	32.2	*	*	*	*	*	*	*	*
PH99MM3 239	34.1	11.5	29.4	*	*	*	*	*	*	*	*
PH99MM4 357	29.8	13.1	35.3	*	*	*	*	*	*	*	*
PH99MM5 493	39.7	15.0	40.2	*	*	*	*	*	*	*	*
PH99MM6 625	36.1	14.6	33.3	*	*	*	*	*	*	*	*
PH99MM7 721	35.6	11.5	36.8	25	*	67	*	123	*	*	*
METHYL ETHYL KETONE 13.0% 23°C											
PL01MM2 1	21.4	9.2	37.0	17	17	37	36	131	135	55	50
PL01MM3 1	21.2	9.3	26.4	16	17	36	39	141	137	45	49
PL01MM1 1	16.2	8.6	22.9	20	21	39	41	117	127	38	34
PL07MM2 7	18.8	10.9	26.2	37	39	65	64	112	108	71	70
PL07MM3 7	22.4	10.5	30.8	17	24	*	42	124	113	58	55
PL07MM1 7	21.3	9.8	28.0	22	22	45	43	124	126	66	62
PL14MM1 14	19.9	9.6	26.0	22	24	39	44	113	126	52	48
PL14MM2 14	16.7	9.3	23.3	23	26	43	47	120	125	49	56
PL14MM3 14	16.9	9.6	23.7	27	29	51	50	123	122	54	54
PL28MM2 28	10.1	9.6	14.2	26	25	43	40	103	106	38	36
PL28MM3 28	15.5	9.6	22.3	27	27	45	40	105	96	40	35
PL28MM1 28	16.5	9.9	22.7	27	25	45	44	104	115	38	35
PL99MM1 28	17.1	7.0	20.1	*	*	*	*	*	*	*	*
PL56MM2 56	10.1	4.5	8.8	56	52	74	69	102	102	57	56
PL56MM3 56	10.7	5.7	12.3	43	41	66	58	107	102	56	52
PL56MM1 56	13.6	5.4	14.1	34	34	54	51	104	105	48	51
PL99MM2 120	21.3	7.0	21.5	*	*	*	*	*	*	*	*
PL99MM3 234	14.1	8.6	26.1	*	*	*	*	*	*	*	*
PL99MM4 357	20.2	7.6	23.9	*	*	*	*	*	*	*	*
PL99MM5 493	23.8	8.6	25.4	*	*	*	*	*	*	*	*
PL99MM6 626	21.7	3.2	7.3	*	*	*	*	*	*	*	*
PL99MM7 723	21.0	8.3	24.4	22	*	47	*	124	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				ASTM #2 OIL SATURATED 50°C							
PH010M1 1	.6	1.0	1.3	83	84	97	91	120	116	126	123
PH070M1 7	.6	.9	.6	86	85	87	90	93	117	110	103
PH140M1 14	3.3	3.2	4.4	85	89	93	92	111	113	136	134
PH990M1 28	7.2	5.8	10.9	*	*	*	*	*	*	*	*
PH280M1 28	2.0	1.6	1.9	84	85	93	94	112	120	102	98
PH560M1 56	1.9	1.9	2.5	82	88	95	93	126	116	109	106
PH990M2 128	16.3	100.0	100.0	*	*	*	*	*	*	*	*
PH990M3 251	27.1	7.4	30.3	*	*	*	*	*	*	*	*
PH990M4 364	30.1	17.3	48.2	*	*	*	*	*	*	*	*
PH990M5 503	29.4	14.1	40.9	*	*	*	*	*	*	*	*
PH990M6 626	27.4	1.9	27.6	*	*	*	*	*	*	*	*
PH990M7 728	27.9	16.0	46.6	133	*	88	*	61	*	*	*
				ASTM #2 OIL SATURATED 23°C							
PL010M3 1	.2	*	.3	81	80	92	93	111	122	128	121
PL010M1 1	.1	.3	.5	81	81	96	91	114	114	126	126
PL010M2 1	.3	.3	.1	81	81	94	92	111	120	122	109
PL070M1 7	.4	*	.2	84	86	97	94	116	117	110	105
PL070M2 7	.5	*	.2	80	82	95	92	117	122	107	102
PL070M3 7	.2	*	.1	80	83	95	91	116	117	104	106
PL140M2 14	.7	.3	.8	80	82	96	91	117	117	109	100
PL140M1 14	.6	.6	1.1	83	85	93	95	111	122	125	126
PL140M3 14	.6	*	.7	71	82	95	94	120	120	108	102
PL280M1 28	1.1	.6	.4	86	94	95	98	105	102	100	96
PL280M2 28	.4	*	.2	80	82	92	94	107	119	130	125
PL280M3 28	1.3	.6	.8	81	81	94	92	110	116	134	130
PL990M1 28	.2	3.5	2.8	*	*	*	*	*	*	*	*
PL560M2 56	.9	.3	.7	77	79	94	92	114	127	113	110
PL560M1 56	.8	.6	.9	93	84	96	97	106	119	111	105
PL560M3 56	1.0	1.3	1.3	77	82	92	95	117	115	110	114
PL990M2 128	.9	1.0	1.1	*	*	*	*	*	*	*	*
PL990M3 237	.1	1.3	1.6	*	*	*	*	*	*	*	*
PL990M4 364	1.1	1.3	1.4	*	*	*	*	*	*	*	*
PL990M5 503	.3	.6	.6	*	*	*	*	*	*	*	*
PL990M6 626	1.6	1.0	1.5	*	*	*	*	*	*	*	*
PL990M7 730	1.2	3.5	2.2	110	*	100	*	104	*	*	*
				ASTM #2 OIL 100.0% 50°C							
PH010P1 1	2.6	.9	4.0	85	88	94	93	118	118	105	101
PH070P1 7	6.1	1.0	7.4	116	122	96	100	87	98	129	122
PH140P1 14	8.3	1.3	9.4	126	133	100	104	86	99	150	138
PH280P1 28	11.2	3.5	13.5	139	155	100	108	91	83	179	173
PH990P1 28	11.4	1.9	12.3	*	*	*	*	*	*	*	*
PH560P1 56	12.2	1.3	5.4	166	171	108	109	87	92	210	208
PH990P2 141	14.9	*	13.8	*	*	*	*	*	*	*	*
PH990P3 257	15.7	3.8	18.2	*	*	*	*	*	*	*	*
PH990P4 385	16.9	5.4	20.2	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
ASTM #2 OIL 100.0% 50°C											
PH990P5 509	16.9	4.4	19.5	*	*	*	*	*	*	*	*
PH990P6 627	17.1	5.7	20.6	*	*	*	*	*	*	*	*
PH990P7 734	17.5	5.4	15.5	*	*	188	*	10	*	*	*
ASTM #2 OIL 100.0% 23°C											
PL010P1 1	.8	.3	1.2	79	81	98	94	126	124	96	92
PL010P3 1	.6	*	.3	85	86	99	92	112	106	129	129
PL010P2 1	.6	.3	.4	87	88	98	96	109	117	158	148
PL070P2 7	1.9	1.6	3.1	88	88	100	92	128	120	105	99
PL070P3 7	1.6	1.0	2.2	83	85	89	92	117	118	97	96
PL070P1 7	1.8	.6	2.3	96	95	101	98	104	111	101	98
PL140P2 14	2.6	1.0	3.0	93	94	99	97	111	118	119	110
PL140P3 14	2.6	*	2.0	91	95	95	94	109	113	122	111
PL140P1 14	2.2	.6	3.0	104	105	101	102	103	112	104	100
PL280P1 28	3.6	1.3	4.4	99	108	100	101	103	103	160	167
PL280P3 28	3.6	1.0	3.9	106	108	101	100	99	106	125	122
PL280P2 28	3.6	.6	4.1	100	102	100	98	105	108	151	167
PL990P1 28	3.7	.3	3.9	*	*	*	*	*	*	*	*
PL560P2 55	4.9	2.5	14.0	112	115	102	99	104	103	137	139
PL560P3 55	3.8	1.0	4.2	108	108	95	99	91	109	130	132
PL560P1 56	4.7	.3	4.4	115	116	103	100	105	107	135	132
PL990P2 141	7.0	1.6	7.7	*	*	*	*	*	*	*	*
PL990P3 244	8.8	3.2	10.2	*	*	*	*	*	*	*	*
PL990P4 385	9.9	4.1	12.3	*	*	*	*	*	*	*	*
PL990P5 509	10.4	3.2	12.1	*	*	*	*	*	*	*	*
PL990P6 627	11.2	4.8	13.9	*	*	*	*	*	*	*	*
PL990P7 736	11.6	1.9	11.4	158	*	99	*	78	*	*	*
PHENOL 8.0% 50°C											
PH01PH1 1	4.2	2.9	2.7	75	75	87	84	96	95	83	82
PH07PH1 7	7.8	1.6	11.6	107	111	101	101	91	96	136	135
PH14PH1 14	9.3	2.9	10.3	108	112	101	103	97	104	103	102
PH28PH1 28	9.6	.6	13.1	108	113	100	102	101	100	151	144
PH99PH1 29	5.6	1.6	9.0	*	*	*	*	*	*	*	*
PH56PH1 56	9.9	1.3	13.4	109	111	98	95	98	98	154	149
PH99PH2 121	8.4	1.3	9.0	*	*	*	*	*	*	*	*
PH99PH3 243	4.1	.9	7.5	*	*	*	*	*	*	*	*
PH99PH4 362	6.4	.9	8.7	*	*	*	*	*	*	*	*
PH99PH5 499	1.1	.3	3.8	*	*	*	*	*	*	*	*
PH99PH6 624	4.0	.9	7.9	*	*	*	*	*	*	*	*
PH99PH7 720	6.5	1.9	10.6	143	*	88	*	51	*	*	*
PHENOL 8.0% 23°C											
PL01PH1 1	12.1	3.9	10.0	61	59	81	78	93	98	79	74
PL01PH2 1	11.4	3.9	9.5	61	59	76	80	92	106	81	74
PL01PH3 1	11.2	3.9	9.5	59	59	79	78	100	105	84	77

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
PHENOL 8.0% 23°C											
PL07PH1 7	3.5	1.0	6.2	87	87	92	90	88	90	123	118
PL07PH2 7	4.7	1.0	7.8	88	88	100	97	105	106	120	115
PL07PH3 7	5.0	1.6	9.0	87	87	101	97	106	108	118	113
PL14PH2 14	7.2	1.9	11.0	90	90	101	100	98	102	121	119
PL14PH1 14	6.7	1.9	10.3	90	93	97	99	95	102	123	121
PL14PH3 14	7.2	1.9	10.8	84	97	97	106	111	97	123	119
PL28PH2 28	9.2	2.9	13.4	93	97	100	99	97	99	135	128
PL28PH3 28	9.3	2.9	13.3	94	94	100	95	103	101	130	124
PL28PH1 28	8.9	2.9	13.3	95	94	99	95	100	106	135	132
PL99PH1 29	4.5	1.6	8.2	*	*	*	*	*	*	*	*
PL56PH1 56	11.2	3.5	15.6	99	104	102	102	101	97	146	134
PL56PH2 56	11.2	3.5	15.8	106	105	100	97	91	107	147	143
PL56PH3 56	10.8	3.8	13.8	102	108	100	104	97	107	139	139
PL99PH2 121	7.8	1.3	10.6	*	*	*	*	*	*	*	*
PL99PH3 230	8.8	3.5	12.8	*	*	*	*	*	*	*	*
PL99PH4 362	9.4	2.2	12.3	*	*	*	*	*	*	*	*
PL99PH5 499	8.9	3.8	14.0	*	*	*	*	*	*	*	*
PL99PH6 625	14.4	4.1	19.6	*	*	*	*	*	*	*	*
PL99PH7 722	16.1	4.1	19.8	149	*	100	*	38	*	*	*
PHENOL 1.0% 50°C											
PH01PL1 1	3.2	2.2	3.4	81	79	94	97	90	100	89	87
PH07PL1 7	4.6	2.5	4.8	81	83	95	94	101	101	97	90
PH14PL1 14	4.9	3.2	5.2	75	78	94	94	108	109	91	87
PH99PL1 28	4.7	2.2	5.4	*	*	*	*	*	*	*	*
PH28PL1 28	4.9	3.5	5.6	73	76	91	95	112	116	93	87
PH56PL1 56	5.2	3.8	5.8	77	74	92	90	109	114	90	89
PH99PL2 122	5.0	1.9	5.6	*	*	*	*	*	*	*	*
PH99PL3 245	5.7	2.5	6.7	*	*	*	*	*	*	*	*
PH99PL4 363	5.8	4.1	8.8	*	*	*	*	*	*	*	*
PH99PL5 499	6.0	2.2	6.4	*	*	*	*	*	*	*	*
PH99PL6 625	8.0	3.1	8.1	*	*	*	*	*	*	*	*
PH99PL7 721	7.5	2.8	9.0	80	*	92	*	103	*	*	*
PHENOL 1.0% 23°C											
PL01PL2 1	2.1	.6	1.2	83	85	98	99	101	110	96	96
PL01PL3 1	2.4	1.0	2.0	85	84	102	97	106	106	99	94
PL01PL1 1	1.7	.3	1.3	83	*	97	99	93	104	88	82
PL07PL2 7	3.9	1.6	4.1	76	77	100	95	112	109	93	88
PL07PL1 7	4.1	1.3	4.1	80	78	96	93	95	98	103	97
PL07PL3 7	3.6	2.2	100.0	74	73	98	96	112	117	89	85
PL14PL2 14	3.9	1.6	3.7	73	74	100	97	111	114	88	84
PL14PL3 14	3.6	1.6	3.7	76	74	101	100	112	119	91	84
PL14PL1 14	4.1	1.9	4.7	73	73	95	99	105	117	88	86
PL28PL1 28	4.4	2.2	4.5	72	74	95	93	114	117	90	87
PL28PL3 28	4.6	1.9	4.9	70	70	89	93	107	116	87	81
PL28PL2 28	4.7	2.2	4.7	68	70	93	92	113	120	88	82

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
PHENOL 1.0% 23°C											
PL99PL1 28	4.1	.9	1.8	*	*	*	*	*	*	*	*
PL56PL3 56	4.5	1.9	4.7	69	73	94	96	123	123	90	86
PL56PL1 56	4.5	2.2	4.5	75	73	95	94	106	118	84	86
PL56PL2 56	4.5	2.2	5.3	70	71	95	91	114	117	89	81
PL99PL2 122	4.4	1.2	4.8	*	*	*	*	*	*	*	*
PL99PL3 233	4.2	1.6	5.9	*	*	*	*	*	*	*	*
PL99PL4 363	4.7	1.9	6.0	*	*	*	*	*	*	*	*
PL99PL5 499	4.5	1.2	4.9	*	*	*	*	*	*	*	*
PL99PL6 626	5.8	1.9	6.8	*	*	*	*	*	*	*	*
PL99PL7 723	5.5	2.2	7.1	83	*	102	*	114	*	*	*
PHENOL 4.0% 50°C											
PH01PM1 1	7.4	3.8	7.4	68	69	86	82	95	94	75	68
PH07PM1 7	.2	1.3	1.0	87	89	94	93	96	97	104	101
PH14PM1 14	.6	.6	2.5	85	87	94	95	104	107	146	143
PH28PM1 28	1.2	1.0	2.7	88	91	97	97	104	105	118	106
PH99PM1 29	6.4	1.9	4.8	*	*	*	*	*	*	*	*
PH56PM1 56	3.1	.3	5.2	93	95	101	95	105	101	112	112
PH99PM2 121	4.9	1.6	3.7	*	*	*	*	*	*	*	*
PH99PM3 244	3.0	.9	1.5	*	*	*	*	*	*	*	*
PH99PM4 362	3.5	1.3	2.9	*	*	*	*	*	*	*	*
PH99PM5 499	3.5	1.9	2.5	*	*	*	*	*	*	*	*
PH99PM6 624	2.3	.6	.7	*	*	*	*	*	*	*	*
PH99PM7 720	1.0	.6	.1	118	*	103	*	112	*	*	*
PHENOL 4.0% 23°C											
PL01PM2 1	8.0	2.6	7.8	65	64	89	87	103	108	92	77
PL01PM1 1	8.4	2.6	7.9	64	63	87	88	97	105	81	72
PL01PM3 1	8.5	2.6	7.7	63	64	87	87	101	108	84	78
PL07PM2 7	3.5	1.6	2.4	73	73	97	95	108	109	93	85
PL07PM1 7	5.3	1.6	3.9	74	73	92	86	97	94	89	87
PL07PM3 7	3.7	1.9	2.7	70	70	96	94	111	112	89	85
PL14PM3 14	1.6	1.0	.2	73	73	93	95	100	109	93	87
PL14PM2 14	2.3	1.3	.6	71	72	98	93	112	106	93	87
PL14PM1 14	2.0	1.0	.6	74	73	97	92	109	105	96	91
PL28PM1 28	.1	.3	2.1	76	79	95	93	104	103	102	98
PL28PM3 28	.7	.3	2.3	75	78	99	96	110	109	101	98
PL28PM2 28	.3	*	2.2	75	77	96	93	101	102	99	95
PL99PM1 29	4.9	1.3	3.8	*	*	*	*	*	*	*	*
PL56PM2 56	1.9	.9	4.4	79	82	94	98	119	117	108	103
PL56PM3 56	2.0	.6	4.2	79	79	101	93	129	121	113	103
PL56PM1 56	2.8	.6	5.1	82	84	97	98	105	103	105	104
PL99PM2 121	5.6	1.3	4.3	*	*	*	*	*	*	*	*
PL99PM3 231	7.0	1.9	7.0	*	*	*	*	*	*	*	*
PL99PM4 362	5.0	1.6	3.5	*	*	*	*	*	*	*	*
PL99PM5 499	.2	.6	3.4	*	*	*	*	*	*	*	*
PL99PM6 625	2.6	2.2	6.9	*	*	*	*	*	*	*	*
PL99PM7 722	4.5	1.0	6.3	118	*	98	*	107	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				SODIUM CHLORIDE 35.0% 50°C							
PH01SH1 1	.1	.3	.7	79	82	93	92	113	113	98	95
PH07SH1 7	.1	100.0	100.0	81	82	96	93	127	125	97	91
PH14SH1 14	*	.3	.7	*	*	*	*	*	*	93	92
PH99SH1 28	.4	.3	.4	*	*	*	*	*	*	*	*
PH28SH1 28	.1	.3	.3	91	88	104	99	122	127	93	95
PH56SH1 56	.2	*	.3	87	89	95	95	110	113	103	99
PH99SH2 131	.3	.3	.5	*	*	*	*	*	*	*	*
PH99SH3 253	.4	.6	.2	*	*	*	*	*	*	*	*
PH99SH4 379	*	1.3	1.3	*	*	*	*	*	*	*	*
PH99SH5 510	.3	*	.9	*	*	*	*	*	*	*	*
PH99SH6 630	.5	.3	.6	*	*	*	*	*	*	*	*
PH99SH7 734	.6	.6	.4	104	*	96	*	106	*	*	*
				SODIUM CHLORIDE 35.0% 23°C							
PL01SH1 1	.1	.6	.8	89	89	97	96	110	115	103	95
PL01SH2 1	*	*	.1	92	93	98	95	107	109	98	90
PL01SH3 1	*	.3	*	86	87	99	96	112	118	96	91
PL07SH2 7	.1	.3	.8	82	82	97	91	115	111	95	94
PL07SH1 7	*	*	.2	81	83	94	94	112	120	93	91
PL07SH3 7	*	.6	.9	75	78	101	95	152	137	92	88
PL14SH3 14	.1	*	*	90	85	100	97	112	127	101	96
PL14SH1 14	*	.6	.9	*	*	*	*	*	*	94	90
PL14SH2 14	.4	.6	.1	88	*	108	*	126	*	102	99
PL28SH2 28	.1	*	*	84	97	97	113	115	126	97	99
PL28SH3 28	.2	.3	.3	84	91	95	109	110	125	96	103
PL99SH1 28	*	.3	.2	*	*	*	*	*	*	*	*
PL28SH1 28	*	*	.3	85	90	98	97	112	108	98	92
PL56SH1 56	.1	*	.3	80	75	100	101	120	155	100	92
PL56SH3 56	.1	*	.7	88	97	95	104	112	112	91	101
PL56SH2 56	.1	*	.4	87	102	94	106	116	110	97	
PL99SH2 131	.3	*	*	*	*	*	*	*	*	*	*
PL99SH3 246	*	1.0	1.3	*	*	*	*	*	*	*	*
PL99SH4 379	.1	.6	.5	*	*	*	*	*	*	*	*
PL99SH5 510	.3	*	.1	*	*	*	*	*	*	*	*
PL99SH6 630	.1	.3	.2	*	*	*	*	*	*	*	*
PL99SH7 736	.2	.6	.6	98	*	105	*	111	*	*	*
				SODIUM CHLORIDE 10.0% 50°C							
PH01SM1 1	.2	*	.1	87	92	98	98	102	105	96	90
PH07SM1 7	.2	*	.4	92	93	100	95	116	108	100	104
PH14SM1 14	*	.9	.3	96	96	103	100	104	107	103	104
PH28SM1 28	.1	1.3	.2	89	91	97	96	111	116	104	104
PH99SM1 28	.3	.3	.5	*	*	*	*	*	*	*	*
PH56SM1 61	.1	.6	.1	91	102	98	95	104	98	112	111
PH99SM2 132	.6	*	.8	*	*	*	*	*	*	*	*
PH99SM3 254	.5	*	.8	*	*	*	*	*	*	*	*
PH99SM4 370	.4	.6	.1	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				SODIUM CHLORIDE 10.0% 50°C							
PH99SM5 511	.3	1.9	1.3	*	*	*	*	*	*	*	*
PH99SM6 624	.6	.3	1.3	*	*	*	*	*	*	*	*
PH99SM7 735	.7	.3	.6	106	*	104	*	106	*	*	*
				SODIUM CHLORIDE 10.0% 23°C							
PL01SM2 1	.2	*	1.0	91	89	101	92	102	94	94	92
PL01SM3 1	.2	*	.1	89	88	99	94	102	97	93	91
PL01SM1 1	.2	*	*	88	88	98	95	102	101	93	90
PL07SM2 7	.4	*	.2	88	87	97	95	110	113	104	98
PL07SM3 7	.4	*	.2	89	89	101	97	117	117	105	95
PL07SM1 7	.2	*	.1	86	93	100	97	121	112	107	95
PL14SM1 14	*	.6	.7	92	94	101	100	100	103	105	104
PL14SM3 15	.4	*	.3	100	105	97	101	89	101	114	111
PL14SM2 15	.3	.3	*	99	101	99	98	97	101	111	108
PL99SM1 28	.1	*	*	*	*	*	*	*	*	*	*
PL28SM3 28	.2	.3	.1	90	86	102	98	105	115	95	93
PL28SM2 28	.2	.3	.5	84	85	97	99	104	121	101	94
PL28SM1 28	.1	.3	.2	86	84	100	95	107	120	95	98
PL56SM2 56	*	*	*	85	92	96	95	100	103	106	100
PL56SM3 56	*	*	*	88	94	99	96	102	100	104	105
PL56SM1 61	.2	.3	.4	96	88	101	93	102	105	113	104
PL99SM2 132	.3	.3	.2	*	*	*	*	*	*	*	*
PL99SM3 246	*	*	.8	*	*	*	*	*	*	*	*
PL99SM4 370	.2	.3	.2	*	*	*	*	*	*	*	*
PL99SM5 511	*	.3	.7	*	*	*	*	*	*	*	*
PL99SM6 624	.8	.3	.7	*	*	*	*	*	*	*	*
PL99SM7 737	.9	1.0	.8	97	*	101	*	102	*	*	*
				WATER 100.0% 50°C							
PH01WP1 1	.8	*	.3	92	95	97	97	92	97	101	98
PH07WP1 7	1.2	1.3	1.3	84	87	100	96	120	117	100	100
PH14WP1 14	1.7	1.6	1.9	108	108	102	101	90	96	105	99
PH28WP1 28	1.7	1.9	2.2	87	94	92	96	99	105	105	102
PH99WP1 28	2.1	.9	1.4	*	*	*	*	*	*	*	*
PH56WP1 56	1.4	1.9	1.9	97	98	99	93	94	100	107	103
PH99WP2 133	2.3	1.9	2.7	*	*	*	*	*	*	*	*
PH99WP3 254	2.7	.9	2.1	*	*	*	*	*	*	*	*
PH99WP4 370	2.5	2.2	3.6	*	*	*	*	*	*	*	*
PH99WP5 503	2.6	.9	1.8	*	*	*	*	*	*	*	*
PH99WP6 622	2.6	.6	1.8	*	*	*	*	*	*	*	*
PH99WP7 735	2.5	1.6	2.5	96	*	95	*	112	*	*	*
				WATER 100.0% 23°C							
PL01WP2 1	.1	.3	.3	94	96	103	101	105	101	99	97
PL01WP1 1	.3	*	.3	95	96	103	102	107	113	99	96
PL01WP3 1	*	.3	.3	93	99	105	101	111	104	100	97

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
WATER 100.0% 23°C											
PL07WP2 7	.4	*	.3	85	84	99	97	108	114	96	100
PL07WP1 7	.6	.3	.5	84	88	96	97	104	111	98	99
PL07WP3 7	.5	.3	.8	85	85	96	94	100	115	100	97
PL14WP1 14	.8	1.6	2.2	94	103	97	103	89	100	108	98
PL14WP2 14	.8	1.0	1.2	90	91	97	98	100	106	96	92
PL14WP3 14	.9	.9	1.3	89	92	98	98	102	107	99	94
PL28WP1 28	.7	.6	1.0	93	95	100	99	105	110	106	98
PL99WP1 28	1.0	.6	.5	*	*	*	*	*	*	*	*
PL28WP2 28	.9	.6	.2	93	85	99	96	103	116	95	95
PL28WP3 28	.8	.3	.3	93	87	102	99	118	121	108	92
PL56WP3 56	1.1	1.3	2.0	109	112	100	87	91	88	112	112
PL56WP2 56	.9	.3	1.0	100	102	96	95	94	93	114	110
PL56WP1 56	.8	1.0	1.7	96	99	99	93	102	92	104	100
PL99WP2 132	1.5	.9	.8	*	*	*	*	*	*	*	*
PL99WP3 247	.8	.6	2.6	*	*	*	*	*	*	*	*
PL99WP4 370	1.8	.3	.6	*	*	*	*	*	*	*	*
PL99WP5 503	1.4	.6	.5	*	*	*	*	*	*	*	*
PL99WP6 622	1.2	.9	.6	*	*	*	*	*	*	*	*
PL99WP7 737	.7	.3	.1	100	*	106	*	107	*	*	*
POTASSIUM DICHROMATE 10.0% 50°C											
PH01XM1 1	.4	*	.2	83	80	97	94	102	129	94	101
PH07XM1 7	.5	*	.2	88	96	103	100	117	109	100	97
PH14XM1 14	.3	.3	.1	94	99	103	97	110	102	108	102
PH99XM1 28	.4	.6	.1	*	*	*	*	*	*	*	*
PH28XM1 28	.2	1.0	.7	86	98	99	96	108	105	99	99
PH56XM1 56	.6	.6	*	93	91	101	98	109	117	104	103
PH99XM2 118	.5	.6	.3	*	*	*	*	*	*	*	*
PH99XM3 231	.6	.3	*	*	*	*	*	*	*	*	*
PH99XM4 363	.2	.6	.2	*	*	*	*	*	*	*	*
PH99XM5 489	.2	.3	.5	*	*	*	*	*	*	*	*
PH99XM6 609	.1	.3	.1	*	*	*	*	*	*	*	*
PH99XM7 712	*	.3	.2	105	*	100	*	96	*	*	*
POTASSIUM DICHROMATE 10.0% 23°C											
PL01XM2 1	.2	.3	.1	97	92	107	99	108	114	108	103
PL01XM1 1	.2	.3	.4	90	83	98	100	108	131	95	98
PL01XM3 1	.2	.6	.8	97	87	102	90	101	96	102	104
PL07XM3 7	.3	*	.3	92	89	96	91	92	94	105	113
PL07XM1 7	.5	*	.2	86	90	102	98	111	108	104	99
PL07XM2 7	.4	.3	.1	93	89	96	91	91	92	107	101
PL14XM3 14	.3	.3	.5	71	86	92	98	107	101	90	99
PL14XM1 14	.3	.6	.4	91	97	99	99	101	100	108	99
PL14XM2 14	.5	.3	.3	76	90	94	107	114	105	93	96
PL28XM2 28	.5	*	.1	89	87	99	103	118	106	100	103
PL28XM3 28	.4	.3	.2	84	85	99	104	132	114	105	107
PL99XM1 28	.6	*	.5	*	*	*	*	*	*	*	*

POLYVINYL CHLORIDE: CHEMICAL IMMERSION ANALYSIS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
					POTASSIUM DICHROMATE 10.0% 23°C							
PL28XM1	28	.4	.3	.9	85	85	98	96	100	105	100	100
PL56XM3	56	100.0	*	.2	85	82	102	96	112	112	98	92
PL56XM2	56	100.0	.3	.6	84	84	97	95	105	109	100	98
PL56XM1	56	.6	*	.2	84	83	102	97	116	124	93	98
PL99XM2	118	.6	.3	.5	*	*	*	*	*	*	*	*
PL99XM3	223	.2	*	.3	*	*	*	*	*	*	*	*
PL99XM4	363	.2	*	*	*	*	*	*	*	*	*	*
PL99XM5	489	.3	.3	.3	*	*	*	*	*	*	*	*
PL99XM6	609	.2	.3	.4	*	*	*	*	*	*	*	*
PL99XM7	714	.1	.3	.4	99	*	103	*	102	*	*	*

CPE : FINAL PROPERTIES

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
HYDROCHLORIC ACID 10.0% 50°C													
CH01AM1	1	*	*	*	*	32.70	19.78	55.34	50.82	520.00	512.90	7.62	6.62
CH07AM1	7	2.05	32.00	2.98	1.01	*	*	*	*	*	*	*	*
CH14AM1	14	1.96	30.70	2.99	1.01	37.54	20.50	64.38	51.30	426.20	428.30	8.14	7.38
CH99AM1	28	2.10	33.30	2.99	1.01	*	*	*	*	*	*	*	*
CH28AM1	29	2.05	32.50	2.99	1.01	39.74	19.54	65.86	48.02	374.20	356.20	8.92	7.92
CH56AM1	56	36.19	32.90	7.48	6.92	41.54	21.30	75.90	60.66	403.80	430.90	8.22	8.34
CH99AM2	144	2.22	34.70	2.98	1.02	*	*	*	*	*	*	*	*
CH99AM3	252	2.31	37.00	2.98	1.03	*	*	*	*	*	*	*	*
CH99AM4	368	2.33	36.20	2.98	1.03	*	*	*	*	*	*	*	*
CH99AM5	511	2.40	37.50	2.97	1.04	*	*	*	*	*	*	*	*
CH99AM6	621	2.43	38.00	2.97	1.04	*	*	*	*	*	*	*	*
CH99AM7	732	2.53	40.10	2.97	1.04	32.63	*	55.29	*	396.20	*	*	*
HYDROCHLORIC ACID 10.0% 23°C													
CL01AM1	1	1.92	29.60	3.01	1.01	36.38	19.78	55.30	46.26	505.60	522.60	7.22	6.34
CL07AM1	7	2.02	31.30	2.99	1.00	*	*	*	*	*	*	*	*
CL14AM1	14	2.01	31.50	3.00	1.00	36.62	17.42	54.50	47.06	445.20	596.70	6.90	6.94
CL28AM1	29	1.99	31.00	3.01	1.01	39.78	19.06	60.38	50.90	446.50	584.20	7.13	6.75
CL99AM1	31	2.03	31.20	3.01	1.01	*	*	*	*	*	*	*	*
CL56AM1	56	35.45	32.10	7.43	6.94	37.54	19.14	60.30	51.46	442.00	539.30	7.90	7.62
CL99AM2	144	2.05	31.40	3.01	1.01	*	*	*	*	*	*	*	*
CL99AM3	238	2.04	31.40	3.01	1.02	*	*	*	*	*	*	*	*
CL99AM4	368	2.05	31.50	3.01	1.01	*	*	*	*	*	*	*	*
CL99AM5	511	2.05	31.20	3.01	1.01	*	*	*	*	*	*	*	*
CL99AM6	621	2.05	31.40	3.01	1.02	*	*	*	*	*	*	*	*
CL99AM7	732	2.06	31.80	3.02	1.02	37.68	*	62.83	*	547.42	*	*	*
SODIUM HYDROXIDE 10.0% 50°C													
CH01BM1	1	*	*	*	*	32.98	15.30	54.18	47.54	499.90	664.90	7.36	6.96
CH07BM1	7	2.10	32.70	3.02	1.00	19.82	21.14	49.70	50.18	517.60	457.00	6.92	6.90
CH14BM1	14	2.06	32.30	2.98	1.02	36.34	20.10	62.78	47.98	502.70	462.10	7.54	6.16
CH28BM1	28	2.05	32.70	3.02	0.99	37.82	18.58	59.54	47.38	461.60	519.90	7.18	6.17
CH99BM1	29	2.12	33.10	2.97	1.01	*	*	*	*	*	*	*	*
CH56BM1	56	2.06	32.70	2.97	1.01	40.70	34.34	65.10	60.58	441.70	523.60	5.99	6.90
CH99BM2	144	2.11	33.10	2.97	1.01	*	*	*	*	*	*	*	*
CH99BM3	252	2.13	33.50	2.97	1.01	*	*	*	*	*	*	*	*
CH99BM4	368	2.19	33.30	2.97	1.01	*	*	*	*	*	*	*	*
CH99BM5	510	2.15	33.40	2.97	1.01	*	*	*	*	*	*	*	*
CH99BM6	622	2.16	34.40	2.97	1.01	*	*	*	*	*	*	*	*
CH99BM7	732	2.22	35.20	2.97	1.01	37.98	*	57.39	*	491.08	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM HYDROXIDE 10.0% 23°C												
CL01BM1 1	2.03	31.10	3.00	1.00	41.86	18.94	62.46	53.98	441.00	594.10	8.24	7.12
CL07BM1 7	2.03	31.20	3.01	1.00	37.66	17.30	64.66	55.14	533.10	699.40	7.86	7.10
CL14BM1 14	2.03	31.40	3.01	1.01	35.86	17.74	58.30	51.22	453.40	581.00	7.12	6.48
CL99BM1 28	2.06	31.60	3.00	1.01	*	*	*	*	*	*	*	*
CL28BM1 28	2.03	31.60	3.02	1.00	32.38	17.30	55.42	45.82	534.70	517.30	6.98	6.34
CL56BM1 56	2.04	31.80	3.02	1.01	20.06	16.18	48.42	43.90	489.00	576.10	8.24	7.73
CL99BM2 144	2.06	31.80	3.00	1.01	*	*	*	*	*	*	*	*
CL99BM3 238	2.05	31.80	3.01	1.01	*	*	*	*	*	*	*	*
CL99BM4 368	2.04	31.60	3.00	1.00	*	*	*	*	*	*	*	*
CL99BM5 510	2.04	31.50	3.00	1.00	*	*	*	*	*	*	*	*
CL99BM6 622	2.03	31.60	3.01	1.00	*	*	*	*	*	*	*	*
CL99BM7 732	2.03	31.60	3.01	1.00	41.67	*	64.42	*	564.92	*	*	*
1 2 DICHLOROETHANE .8% 50°C												
CH01DH1 1	2.33	36.50	2.81	1.05	10.20	5.44	22.64	17.58	698.55	877.85	3.45	3.12
CH07DH1 7	2.50	39.70	2.80	1.08	11.27	7.02	29.42	27.31	646.85	734.13	4.54	4.61
CH14DH1 14	2.71	42.90	2.75	1.11	11.85	6.35	27.33	18.21	563.35	601.03	3.39	4.27
CH99DH1 28	2.79	46.50	2.78	1.14	*	*	*	*	*	*	*	*
CH28DH1 29	4.37	61.50	2.63	1.30	6.62	5.00	11.37	9.87	394.50	486.63	3.57	2.50
CH56DH1 56	3.03	48.90	2.73	1.18	11.67	7.01	22.58	16.17	442.65	455.58	5.32	4.53
CH99DH2 133	3.70	60.60	2.71	1.25	*	*	*	*	*	*	*	*
CH99DH3 244	4.58	72.60	2.63	1.29	*	*	*	*	*	*	*	*
CH99DH4 364	4.73	76.10	2.60	1.33	*	*	*	*	*	*	*	*
CH99DH5 495	5.17	87.40	2.55	1.35	*	*	*	*	*	*	*	*
CH99DH6 629	5.44	88.80	2.58	1.37	*	*	*	*	*	*	*	*
CH99DH7 726	4.71	74.20	2.61	1.34	19.04	*	39.41	*	522.17	*	*	*
1 2 DICHLOROETHANE .8% 23°C												
CL01DH1 1	2.29	34.20	2.99	1.04	9.19	4.43	21.20	13.78	685.40	879.68	3.25	2.94
CL07DH1 7	2.37	35.90	2.97	1.05	5.65	3.94	12.28	14.19	618.58	1008.83	4.38	4.26
CL14DH1 14	2.36	35.70	2.98	1.05	9.47	5.27	22.22	15.58	605.90	744.28	2.78	1.47
CL99DH1 28	2.18	33.50	3.01	1.03	*	*	*	*	*	*	*	*
CL28DH1 29	2.57	38.90	2.89	1.11	5.99	4.63	11.87	12.61	496.38	670.68	3.15	3.22
CL56DH1 56	2.49	37.40	2.97	1.10	11.31	5.65	23.10	15.15	448.13	525.30	3.72	3.72
CL99DH2 134	2.73	40.70	2.95	1.13	*	*	*	*	*	*	*	*
CL99DH3 231	2.80	40.70	2.93	1.15	*	*	*	*	*	*	*	*
CL99DH4 364	3.01	43.90	2.91	1.18	*	*	*	*	*	*	*	*
CL99DH5 495	3.31	48.50	2.90	1.22	*	*	*	*	*	*	*	*
CL99DH6 630	4.18	64.60	2.69	1.32	*	*	*	*	*	*	*	*
CL99DH7 725	5.68	85.30	2.44	1.72	6.93	*	16.53	*	533.92	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .1% 50°C												
CH01DL1 1	2.12	32.70	2.99	1.01	28.13	12.56	54.14	49.44	578.98	758.35	6.48	6.16
CH07DL1 7	2.28	35.90	2.94	1.04	24.65	11.76	61.49	42.26	586.55	552.50	5.77	5.95
CH14DL1 14	2.30	36.00	2.95	1.05	25.28	11.88	55.72	31.47	480.20	433.03	5.31	5.77
CH99DL1 28	2.45	39.50	2.95	1.06	*	*	*	*	*	*	*	*
CH28DL1 29	2.44	38.10	2.90	1.07	20.31	9.61	48.12	28.38	526.35	477.08	5.20	5.43
CH56DL1 56	2.64	41.80	2.93	1.08	30.94	13.63	56.27	33.54	377.58	355.23	6.30	5.86
CH99DL2 139	3.10	50.70	2.91	1.12	*	*	*	*	*	*	*	*
CH99DL3 246	3.62	58.50	2.87	1.17	*	*	*	*	*	*	*	*
CH99DL4 366	4.16	65.60	2.84	1.22	*	*	*	*	*	*	*	*
CH99DL5 496	4.37	70.00	2.83	1.23	*	*	*	*	*	*	*	*
CH99DL6 631	4.45	71.20	2.83	1.24	*	*	*	*	*	*	*	*
CH99DL7 728	4.50	73.30	2.83	1.24	31.92	*	52.92	*	357.25	*	*	*
1 2 DICHLOROETHANE .1% 23°C												
CL01DL1 1	2.02	31.00	3.01	1.01	30.06	13.71	54.70	44.49	533.35	697.05	6.85	6.34
CL07DL1 7	2.11	32.50	3.01	1.02	26.03	12.53	51.32	49.85	577.75	808.73	5.97	5.80
CL14DL1 14	2.13	32.60	3.01	1.01	22.54	10.54	45.80	37.51	589.45	742.43	4.82	5.01
CL99DL1 28	2.13	32.80	3.01	1.02	*	*	*	*	*	*	*	*
CL28DL1 29	2.15	32.90	3.00	1.02	19.35	8.63	42.34	28.65	625.28	697.20	4.95	4.81
CL56DL1 56	2.21	33.80	3.00	1.03	24.78	11.26	51.64	40.39	537.60	608.18	6.04	5.88
CL99DL2 136	2.27	34.80	3.01	1.04	*	*	*	*	*	*	*	*
CL99DL3 233	2.34	35.90	3.02	1.05	*	*	*	*	*	*	*	*
CL99DL4 366	2.39	36.50	3.01	1.05	*	*	*	*	*	*	*	*
CL99DL5 496	2.41	37.00	3.01	1.05	*	*	*	*	*	*	*	*
CL99DL6 632	2.44	37.40	3.01	1.38	*	*	*	*	*	*	*	*
CL99DL7 727	2.47	37.90	3.02	1.06	31.23	*	52.78	*	459.00	*	*	*
1 2 DICHLOROETHANE .5% 50°C												
CH01DM1 1	2.23	35.10	2.86	1.04	16.33	8.38	34.60	28.94	647.88	847.88	4.16	4.27
CH07DM1 7	2.45	39.00	2.80	1.08	15.63	8.03	39.33	28.61	635.73	667.58	4.81	4.75
CH14DM1 14	2.56	40.60	2.78	1.11	15.34	7.57	31.93	20.90	491.65	525.55	4.42	4.55
CH99DM1 28	2.68	43.90	2.78	1.11	*	*	*	*	*	*	*	*
CH28DM1 29	2.68	42.30	2.76	1.13	15.44	8.10	32.32	22.44	487.58	520.45	4.45	4.30
CH56DM1 56	2.83	44.90	2.77	1.15	18.93	9.49	35.77	24.77	401.03	433.65	5.96	4.88
CH99DM3 245	3.67	60.90	2.73	1.20	*	*	*	*	*	*	*	*
CH99DM4 365	3.95	65.20	2.73	1.22	*	*	*	*	*	*	*	*
CH99DM5 496	4.44	78.30	2.64	1.25	*	*	*	*	*	*	*	*
CH99DM6 630	4.78	80.50	2.63	1.29	*	*	*	*	*	*	*	*
CH99DM7 727	4.87	84.10	2.61	1.28	31.50	*	52.03	*	371.92	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .5% 23°C												
CL01DM1 1	2.12	32.40	3.01	1.01	19.47	9.69	42.46	38.88	606.03	851.55	5.12	5.37
CL07DM1 7	2.24	33.70	3.02	1.03	12.44	7.17	30.64	28.41	686.65	906.00	4.41	4.15
CL14DM1 14	2.30	34.70	3.01	1.04	12.82	6.54	28.83	21.26	614.68	788.78	3.67	3.58
CL99DM1 28	2.24	34.20	3.01	1.03	*	*	*	*	*	*	*	*
CL28DM1 29	2.32	35.00	2.99	1.05	12.05	6.17	28.37	18.99	565.98	371.60	4.07	3.93
CL56DM1 56	2.38	35.70	3.00	1.06	15.25	6.99	34.16	22.75	476.30	561.15	4.76	4.45
CL99DM2 135	2.36	36.10	3.01	1.05	*	*	*	*	*	*	*	*
CL99DM3 233	2.49	37.80	3.01	1.07	*	*	*	*	*	*	*	*
CL99DM4 365	2.50	38.60	3.00	1.07	*	*	*	*	*	*	*	*
CL99DM5 496	2.73	41.60	2.98	1.10	*	*	*	*	*	*	*	*
CL99DM6 631	2.81	41.90	2.97	1.13	*	*	*	*	*	*	*	*
CL99DM7 726	3.04	44.90	2.94	1.16	15.04	*	31.23	*	539.83	*	*	*
FURFURAL 8.0% 50°C												
CH01FH1 1	2.06	32.30	3.02	1.00	32.10	15.80	55.80	51.16	540.00	730.00	3.78	4.89
CH07FH1 7	3.78	55.50	2.68	1.28	2.80	1.66	6.76	3.88	810.00	940.00	1.62	2.60
CH14FH1 14	4.48	64.20	2.67	1.31	1.89	1.22	4.70	2.52	940.00	990.00	1.30	1.19
CH28FH1 28	5.09	70.90	2.66	1.36	2.14	1.26	5.48	2.70	681.00	783.00	1.26	1.03
CH99FH1 28	5.10	82.10	2.60	1.33	*	*	*	*	*	*	*	*
CH56FH1 56	5.80	82.70	4.15	0.85	2.00	1.16	5.54	2.96	732.00	884.00	1.19	0.93
CH99FH2 117	5.81	91.20	2.59	1.33	*	*	*	*	*	*	*	*
CH99FH3 236	6.25	87.30	2.68	1.39	*	*	*	*	*	*	*	*
CH99FH4 350	5.88	86.40	2.70	1.38	*	*	*	*	*	*	*	*
CH99FH5 485	4.78	83.80	2.69	1.40	*	*	*	*	*	*	*	*
CH99FH6 616	6.24	87.80	2.76	1.43	*	*	*	*	*	*	*	*
CH99FH7 712	6.32	88.90	2.79	1.76	7.93	*	9.05	*	244.00	*	*	*
FURFURAL 8.0% 23°C												
CL01FH1 1	2.01	31.00	3.01	1.00	35.80	17.80	57.70	52.40	490.00	640.00	4.31	5.87
CL07FH1 7	3.23	46.10	2.84	1.21	2.26	1.72	6.13	5.16	958.00	1067.00	1.24	1.05
CL14FH1 14	4.23	54.30	2.83	1.34	1.13	0.64	2.73	1.90	1108.30	1480.00	0.88	0.80
CL99FH1 28	4.70	60.40	2.85	1.39	*	*	*	*	*	*	*	*
CL28FH1 28	4.18	54.40	2.98	1.32	1.72	1.28	4.88	2.95	853.00	822.50	0.97	0.78
CL56FH1 56	5.08	63.80	4.33	0.95	1.51	1.26	3.91	2.47	693.00	930.00	1.14	1.06
CL99FH2 114	5.60	67.20	2.84	1.47	*	*	*	*	*	*	*	*
CL99FH3 219	5.20	65.70	2.84	1.46	*	*	*	*	*	*	*	*
CL99FH4 350	5.70	66.80	2.84	1.47	*	*	*	*	*	*	*	*
CL99FH5 485	4.68	61.20	2.76	1.38	*	*	*	*	*	*	*	*
CL99FH6 617	5.13	62.30	2.76	1.39	*	*	*	*	*	*	*	*
CL99FH7 712	5.25	68.80	3.11	1.35	2.00	*	6.10	*	996.30	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 1.0% 50°C												
CH01FL1 1	2.08	32.10	3.02	1.00	29.40	13.61	53.06	39.61	533.50	586.20	7.45	7.87
CH07FL1 7	2.18	34.80	3.15	0.96	22.60	10.90	46.92	34.46	653.00	680.00	6.14	6.14
CH14FL1 14	2.35	37.50	2.82	1.08	23.30	11.10	46.80	30.50	520.00	524.00	5.98	6.34
CH28FL1 28	2.43	38.70	2.84	1.10	21.70	11.00	58.82	35.32	639.00	535.00	6.33	5.91
CH99FL1 28	2.58	42.30	2.83	1.10	*	*	*	*	*	*	*	*
CH56FL1 56	2.86	45.00	3.44	0.93	20.12	10.00	48.08	27.36	597.00	518.00	5.36	4.94
CH99FL2 123	3.41	53.50	2.81	1.20	*	*	*	*	*	*	*	*
CH99FL3 241	4.14	63.70	2.78	1.27	*	*	*	*	*	*	*	*
CH99FL4 355	4.54	72.10	2.76	1.30	*	*	*	*	*	*	*	*
CH99FL5 489	4.94	75.70	2.74	1.31	*	*	*	*	*	*	*	*
CH99FL6 621	5.14	74.40	2.75	1.30	*	*	*	*	*	*	*	*
CH99FL7 718	4.90	72.70	2.76	1.30	23.03	*	42.41	*	408.33	*	*	*
FURFURAL 1.0% 23°C												
CL01FL1 1	1.94	29.70	3.01	1.00	33.33	14.95	52.98	42.40	469.50	587.50	8.09	10.43
CL07FL1 7	2.10	32.10	3.02	1.01	23.07	12.38	46.20	42.08	616.70	768.80	8.20	6.33
CL14FL1 14	2.13	32.30	3.05	1.01	24.60	11.02	52.54	42.46	693.00	830.00	6.34	6.67
CL99FL1 28	2.14	33.10	3.01	1.02	*	*	*	*	*	*	*	*
CL28FL1 28	2.16	33.10	3.06	1.01	23.30	11.30	49.70	40.84	604.00	739.00	5.78	5.88
CL56FL1 56	2.25	34.20	3.10	1.01	20.34	10.00	46.22	39.62	684.00	850.00	5.03	5.07
CL99FL2 123	2.28	35.00	3.01	1.05	*	*	*	*	*	*	*	*
CL99FL3 224	2.40	36.60	3.02	1.07	*	*	*	*	*	*	*	*
CL99FL4 355	2.52	38.00	3.01	1.08	*	*	*	*	*	*	*	*
CL99FL5 489	2.60	38.80	3.02	1.09	*	*	*	*	*	*	*	*
CL99FL6 622	2.68	40.10	3.01	1.10	*	*	*	*	*	*	*	*
CL99FL7 717	2.72	40.80	3.01	1.11	24.23	*	49.83	*	578.50	*	*	*
FURFURAL 4.0% 50°C												
CH01FM1 1	2.29	35.30	3.13	0.97	11.26	5.89	26.21	18.71	640.70	832.00	4.53	5.21
CH07FM1 7	2.53	39.70	3.32	0.93	9.62	5.90	20.84	17.86	658.00	855.00	4.08	3.61
CH14FM1 14	2.83	44.20	3.43	0.92	9.00	4.58	18.93	14.50	511.30	575.00	3.65	4.13
CH28FM1 28	3.32	50.20	3.56	0.92	7.56	4.30	17.92	11.16	512.00	616.00	3.47	3.39
CH99FM1 29	3.46	54.40	2.70	1.19	*	*	*	*	*	*	*	*
CH56FM1 56	4.10	60.60	3.79	0.90	8.14	5.00	16.90	10.48	436.00	433.80	3.81	4.50
CH99FM2 124	4.94	76.20	2.65	1.34	*	*	*	*	*	*	*	*
CH99FM3 242	5.03	76.20	2.75	1.34	*	*	*	*	*	*	*	*
CH99FM4 356	4.94	75.50	2.65	1.34	*	*	*	*	*	*	*	*
CH99FM5 490	4.90	75.90	2.65	1.34	*	*	*	*	*	*	*	*
CH99FM6 622	5.02	78.10	3.67	1.36	*	*	*	*	*	*	*	*
CH99FM7 719	5.12	79.80	2.69	1.37	18.76	*	23.35	*	383.83	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
					FURFURAL 4.0% 23°C								
CL01FM1	1	2.06	31.80	3.01	1.01	24.12	11.44	44.64	34.52	514.88	630.60	6.79	9.22
CL07FM1	7	2.33	35.50	3.15	0.99	10.74	5.30	26.84	21.08	746.00	1189.00	3.95	4.28
CL14FM1	14	2.40	36.60	3.19	0.97	9.20	4.94	25.26	15.34	723.80	902.00	3.49	3.48
CL28FM1	28	2.58	38.50	3.30	0.97	7.98	4.30	19.94	13.98	578.00	777.00	3.46	3.26
CL99FM1	29	2.51	37.80	2.90	1.10	*	*	*	*	*	*	*	*
CL56FM1	56	2.75	40.70	2.88	1.14	8.20	4.64	21.30	13.30	695.00	769.00	3.03	3.30
CL99FM2	124	2.95	43.50	2.87	1.16	*	*	*	*	*	*	*	*
CL99FM3	228	3.16	46.20	2.86	1.21	*	*	*	*	*	*	*	*
CL99FM4	356	3.67	51.20	2.86	1.27	*	*	*	*	*	*	*	*
CL99FM5	490	4.01	53.30	2.86	1.31	*	*	*	*	*	*	*	*
CL99FM6	623	4.33	56.90	2.84	1.35	*	*	*	*	*	*	*	*
CL99FM7	715	4.50	60.40	2.86	1.39	7.68	*	25.17	*	667.08	*	*	*
					METHYL ETHYL KETONE 8.0% 50°C								
CH01MD1	1	2.48	41.00	3.26	0.94	5.80	3.50	12.30	8.34	689.00	888.50	3.50	3.14
CH07MD1	7	3.45	54.80	3.60	0.89	9.60	5.02	21.50	14.58	546.83	679.90	4.45	5.25
CH14MD1	14	3.69	58.60	3.70	0.89	13.78	7.14	23.74	14.06	415.80	445.60	2.85	2.66
CH28MD1	28	3.60	57.40	3.63	0.91	11.66	6.90	21.90	13.67	445.20	431.10	4.59	4.21
CH56MD1	58	3.50	58.30	3.58	0.90	21.46	11.55	42.37	21.76	470.70	361.50	6.31	5.36
					METHYL ETHYL KETONE 8.0% 23°C								
CL01MD1	1	2.09	32.70	3.02	1.00	15.86	7.90	35.58	27.62	610.10	814.20	5.78	5.10
CL07MD1	7	2.26	35.70	2.93	1.08	9.54	5.02	28.06	19.98	781.30	999.00	4.76	4.87
CL14MD1	14	2.51	39.00	3.28	0.97	18.60	9.94	35.83	24.42	563.75	590.80	3.16	3.18
CL28MD1	28	2.51	38.70	3.31	0.98	11.38	5.79	26.52	17.90	543.38	675.00	4.17	4.67
CL56MD1	56	2.51	39.20	3.29	0.96	17.08	8.40	39.67	24.55	551.10	535.10	5.51	5.88
					METHYL ETHYL KETONE 26.0% 50°C								
CH01MH1	1	4.74	63.70	4.57	0.84	0.55	0.50	0.70	0.90	245.50	335.00	0.73	0.50
CH99MH1	28	7.78	132.00	2.19	1.61	*	*	*	*	*	*	*	*
CH99MH2	122	10.18	137.00	2.24	1.71	*	*	*	*	*	*	*	*
CH99MH3	240	9.51	161.40	2.08	1.60	*	*	*	*	*	*	*	*
CH99MH4	358	7.07	128.80	2.02	1.49	*	*	*	*	*	*	*	*
CH99MH5	494	7.22	140.00	1.98	1.44	*	*	*	*	*	*	*	*
CH99MH6	626	6.16	117.70	1.96	1.38	*	*	*	*	*	*	*	*
CH99MH7	722	5.87	142.50	1.96	1.36	2.62	*	4.50	*	459.00	*	*	*
					METHYL ETHYL KETONE 26.0% 23°C								
CL01MH1	1	3.47	52.20	3.87	0.94	1.10	0.54	1.54	0.70	337.70	513.50	1.02	0.90
CL99MH1	28	6.09	90.30	2.75	1.48	*	*	*	*	*	*	*	*
CL99MH2	121	11.14	121.00	2.97	1.67	*	*	*	*	*	*	*	*
CL99MH3	235	7.26	106.00	2.68	1.62	*	*	*	*	*	*	*	*
CL99MH4	358	8.76	110.80	2.68	1.64	*	*	*	*	*	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ incn width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 26.0% 23°C												
CL99MH5 494	8.39	100.00	2.69	1.64	*	*	*	*	*	*	*	*
CL99MH6 627	7.98	133.00	2.52	1.61	*	*	*	*	*	*	*	*
CL99MH7 721	7.42	104.80	2.59	1.59	0.74	*	2.18	*	661.17	*	*	*
METHYL ETHYL KETONE 3.0% 50°C												
CH01ML1 1	2.12	33.60	3.07	0.98	21.22	9.97	47.06	33.23	601.60	641.83	6.17	5.62
CH07ML1 7	2.50	40.70	3.26	0.93	17.50	8.98	40.82	28.62	574.30	603.00	5.66	6.05
CH14ML1 14	2.63	42.70	3.29	0.94	20.20	10.94	36.40	23.54	452.17	452.40	4.85	4.94
CH28ML1 28	2.21	34.10	3.11	1.01	20.66	10.81	41.90	29.07	461.50	472.50	6.14	5.96
CH99ML1 28	2.80	47.00	2.77	1.12	*	*	*	*	*	*	*	*
CH56ML1 55	2.91	47.00	3.41	0.92	28.34	14.36	53.48	31.41	458.40	390.40	7.77	6.93
CH99ML2 120	3.81	64.80	2.58	1.27	*	*	*	*	*	*	*	*
CH99ML3 240	4.34	70.80	2.59	1.33	*	*	*	*	*	*	*	*
CH99ML4 358	5.08	79.20	2.59	1.38	*	*	*	*	*	*	*	*
CH99ML5 494	5.76	102.90	2.58	1.40	*	*	*	*	*	*	*	*
CH99ML6 626	6.27	109.40	2.57	1.41	*	*	*	*	*	*	*	*
CH99ML7 722	6.46	99.70	2.57	1.41	18.98	*	31.35	*	352.08	*	*	*
METHYL ETHYL KETONE 3.0% 23°C												
CL01ML1 1	1.93	30.10	2.99	1.00	30.70	14.62	58.02	53.10	605.60	821.20	7.46	7.02
CL01ML2 1	2.06	31.90	3.01	1.01	29.94	13.30	53.46	45.62	567.60	751.00	7.06	7.02
CL07ML1 7	2.11	32.40	3.05	1.01	21.20	9.78	46.70	41.06	645.60	890.60	5.76	5.67
CL14ML1 14	2.19	33.70	3.07	1.01	23.50	11.78	40.10	32.06	532.40	643.70	5.06	5.04
CL99ML1 28	2.21	34.00	3.01	1.03	*	*	*	*	*	*	*	*
CL28ML1 28	2.63	42.50	3.33	0.94	25.40	12.44	44.83	36.35	612.88	549.90	5.61	5.18
CL56ML1 55	2.24	34.50	3.09	1.01	23.93	11.01	56.90	34.12	596.20	529.30	6.21	6.39
CL99ML2 120	2.38	36.00	3.02	1.05	*	*	*	*	*	*	*	*
CL99ML3 235	2.49	38.10	3.02	1.07	*	*	*	*	*	*	*	*
CL99ML4 358	2.65	40.00	3.03	1.10	*	*	*	*	*	*	*	*
CL99ML5 494	2.75	41.00	3.01	1.11	*	*	*	*	*	*	*	*
CL99ML6 627	2.83	42.30	3.01	1.11	*	*	*	*	*	*	*	*
CL99ML7 721	2.86	42.80	3.02	1.13	19.78	*	41.47	*	586.92	*	*	*
METHYL ETHYL KETONE 13.0% 50°C												
CH01MM1 1	2.82	45.40	3.40	0.92	3.90	2.80	8.18	6.35	642.00	746.25	2.62	2.34
CH07MM1 7	*	*	*	*	2.77	1.90	6.23	4.37	533.67	676.17	1.50	1.30
CH14MM1 14	5.91	89.90	2.56	1.38	2.67	1.45	5.43	2.73	575.00	582.20	1.33	1.23
CH99MM1 28	2.97	48.50	2.77	1.13	*	*	*	*	*	*	*	*
CH28MM1 28	3.08	46.60	3.56	0.95	4.50	2.91	10.93	7.23	535.88	546.40	3.53	3.01
CH56MM1 55	6.19	101.10	4.20	0.80	2.18	1.35	4.70	2.85	622.38	598.40	1.60	1.19
CH99MM2 120	6.22	100.00	2.45	1.34	*	*	*	*	*	*	*	*
CH99MM3 239	8.37	116.00	2.55	1.64	*	*	*	*	*	*	*	*
CH99MM4 357	9.11	156.60	2.41	1.55	*	*	*	*	*	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 13.0% 50°C													
CH99MM5	493	8.44	*	2.35	1.51	*	*	*	*	*	*	*	*
CH99MM6	625	8.18	146.70	2.33	1.50	*	*	*	*	*	*	*	*
CH99MM7	721	8.24	112.90	2.37	1.50	5.90	*	15.20	*	676.42	*	*	*
METHYL ETHYL KETONE 13.0% 23°C													
CL01MM1	1	2.42	38.10	3.21	0.99	5.18	2.58	11.14	6.22	698.40	895.70	1.98	2.26
CL01MM2	1	2.43	38.50	3.23	0.97	5.22	2.98	11.90	7.34	839.70	999.00	2.14	2.26
CL07MM1	7	2.97	44.90	2.86	1.20	5.70	2.90	17.46	9.38	797.30	991.50	2.81	3.92
CL14MM1	14	3.32	48.20	3.68	0.95	4.26	2.35	8.81	4.99	589.20	686.20	1.63	1.59
CL28MM1	28	5.68	91.00	4.12	0.85	7.93	4.63	17.94	11.06	516.60	563.50	4.70	4.07
CL99MM1	28	3.67	53.10	2.84	1.27	*	*	*	*	*	*	*	*
CL56MM1	55	3.81	55.00	3.93	0.93	6.49	4.12	17.06	10.37	572.20	590.50	3.50	3.27
CL99MM2	120	4.68	62.70	2.85	1.40	*	*	*	*	*	*	*	*
CL99MM3	234	5.89	112.00	2.47	1.35	*	*	*	*	*	*	*	*
CL99MM4	357	6.17	105.20	2.47	1.36	*	*	*	*	*	*	*	*
CL99MM5	493	6.16	*	2.46	1.34	*	*	*	*	*	*	*	*
CL99MM6	626	6.13	102.20	2.44	1.32	*	*	*	*	*	*	*	*
CL99MM7	720	6.18	103.70	2.47	1.34	3.32	*	11.29	*	734.25	*	*	*
ASTM #2 OIL SATURATED 50°C													
CH010M1	1	2.04	31.60	3.02	1.00	31.66	15.78	51.58	45.74	542.10	726.30	6.70	6.58
CH070M1	7	2.19	44.10	3.07	1.00	31.46	15.02	50.86	42.18	494.60	613.00	7.66	6.82
CH140M1	14	2.19	34.30	3.09	1.00	29.74	13.15	48.90	37.78	543.60	713.20	8.42	7.26
CH990M1	28	2.39	37.80	2.97	1.05	*	*	*	*	*	*	*	*
CH280M1	28	2.37	37.20	3.14	0.99	25.40	10.70	50.00	43.80	462.00	543.00	5.90	5.44
CH560M1	56	2.56	40.20	3.01	0.99	30.50	13.50	50.38	34.94	464.00	550.70	6.26	5.66
CH990M2	128	3.06	*	2.94	1.11	*	*	*	*	*	*	*	*
CH990M3	251	3.62	59.20	2.91	1.16	*	*	*	*	*	*	*	*
CH990M4	364	3.94	61.70	2.90	1.19	*	*	*	*	*	*	*	*
CH990M5	503	4.30	67.80	2.89	1.21	*	*	*	*	*	*	*	*
CH990M6	626	4.49	70.70	2.89	1.23	*	*	*	*	*	*	*	*
CH990M7	727	4.70	74.20	2.89	1.23	29.47	*	47.73	*	347.25	*	*	*
ASTM #2 OIL SATURATED 23°C													
CL010M1	1	2.02	31.00	3.01	1.00	31.94	15.58	52.38	47.94	523.50	725.40	6.86	6.54
CL070M1	7	2.05	31.40	3.02	1.00	33.90	17.18	53.98	47.54	478.30	685.00	8.46	6.78
CL140M1	13	2.07	31.80	3.02	1.01	30.34	14.30	51.18	44.54	560.40	760.30	8.30	7.30
CL990M1	28	2.10	32.50	3.01	1.01	*	*	*	*	*	*	*	*
CL280M1	28	2.10	32.30	3.04	1.01	25.40	10.70	50.00	43.80	560.00	745.00	6.30	5.80
CL560M1	56	2.11	32.40	3.01	1.02	32.02	14.55	51.86	45.30	486.70	654.63	7.54	6.54
CL990M2	128	2.23	34.20	3.01	1.02	*	*	*	*	*	*	*	*
CL990M3	237	2.27	35.10	3.01	1.04	*	*	*	*	*	*	*	*
CL990M4	364	2.32	35.60	3.01	1.03	*	*	*	*	*	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
ASTM #2 OIL SATURATED 23°C												
CL990M5 503	2.34	35.90	3.01	1.03	*	*	*	*	*	*	*	*
CL990M6 626	2.37	36.60	3.01	1.04	*	*	*	*	*	*	*	*
CL990M7 727	2.41	37.20	3.01	1.04	32.63	*	59.93	*	519.25	*	*	*
ASTM #2 OIL 100.0% 50°C												
CH010P1 1	1.97	30.60	3.00	1.01	27.45	12.45	45.20	38.05	567.00	750.50	5.86	5.65
CH070P1 7	2.12	32.70	3.04	1.00	29.80	12.04	49.60	42.20	462.00	639.00	5.90	5.50
CH140P1 14	2.15	33.20	3.06	1.00	34.26	15.58	54.22	44.50	467.80	604.10	6.10	5.30
CH990P1 28	2.21	34.40	3.00	1.03	*	*	*	*	*	*	*	*
CH280P1 28	2.16	33.30	3.05	1.00	30.78	13.50	46.74	42.00	410.70	659.75	5.98	5.70
CH560P1 56	2.17	33.80	3.07	1.00	34.55	14.06	53.75	43.46	435.33	606.50	7.06	6.70
CH990P2 141	2.33	36.50	3.00	1.04	*	*	*	*	*	*	*	*
CH990P3 257	2.40	37.30	3.00	1.04	*	*	*	*	*	*	*	*
CH990P4 385	2.39	37.70	3.01	1.04	*	*	*	*	*	*	*	*
CH990P5 509	2.41	37.60	3.00	1.04	*	*	*	*	*	*	*	*
CH990P6 627	2.43	37.60	3.00	1.05	*	*	*	*	*	*	*	*
CH990P7 733	2.43	38.10	3.01	1.05	36.45	*	55.16	*	421.25	*	*	*
ASTM #2 OIL 100.0% 23°C												
CL010P1 1	2.01	30.80	3.01	1.01	28.82	13.30	49.46	40.54	599.00	826.20	6.10	5.66
CL070P1 7	2.01	31.00	3.01	1.00	35.34	16.62	58.54	49.70	531.70	668.80	6.30	5.60
CL140P1 14	1.94	30.20	3.00	1.00	28.40	11.76	52.00	44.40	577.00	726.00	6.40	5.90
CL990P1 28	2.02	31.10	3.00	1.00	*	*	*	*	*	*	*	*
CL280P1 28	2.06	31.50	3.01	1.01	33.70	15.03	55.38	49.03	494.60	671.00	7.86	6.66
CL560P1 56	2.05	31.30	3.00	1.00	35.03	16.54	56.10	48.94	518.67	698.00	7.48	7.22
CL990P2 141	2.05	31.40	3.01	1.01	*	*	*	*	*	*	*	*
CL990P3 244	2.06	31.70	3.01	1.01	*	*	*	*	*	*	*	*
CL990P4 385	2.08	31.90	3.01	1.01	*	*	*	*	*	*	*	*
CL990P5 509	2.10	32.10	3.01	1.01	*	*	*	*	*	*	*	*
CL990P6 627	2.13	32.00	2.68	1.01	*	*	*	*	*	*	*	*
CL990P7 733	2.11	32.80	3.02	1.02	37.00	*	57.52	*	518.58	*	*	*
PHENOL 8.0% 50°C												
CH01PH1 1	2.56	39.30	2.87	1.08	9.74	4.85	26.36	20.41	547.15	680.88	2.91	3.07
CH07PH1 7	3.30	49.90	2.74	1.21	7.79	3.93	15.53	9.71	403.68	468.73	2.77	2.80
CH14PH1 14	3.45	52.40	2.76	1.21	5.56	2.20	16.40	8.19	533.35	553.83	2.83	2.25
CH28PH1 28	4.11	72.40	2.77	1.21	7.55	4.23	15.28	9.61	490.60	519.18	2.87	2.34
CH99PH1 29	3.82	61.30	2.75	1.24	*	*	*	*	*	*	*	*
CH56PH1 56	4.85	*	2.67	1.25	7.52	4.14	14.88	9.51	504.78	579.20	2.59	2.12
CH99PH2 121	5.29	111.00	2.71	1.27	*	*	*	*	*	*	*	*
CH99PH3 243	6.26	130.00	2.68	1.26	*	*	*	*	*	*	*	*
CH99PH4 362	6.64	130.70	2.67	1.25	*	*	*	*	*	*	*	*
CH99PH5 499	6.90	*	2.72	1.29	*	*	*	*	*	*	*	*
CH99PH6 624	6.42	99.60	2.70	1.27	*	*	*	*	*	*	*	*
CH99PH7 720	5.98	96.60	2.69	1.26	5.10	*	16.37	*	826.08	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				PHENOL	8.0% 23°C							
CL01PH1 1	2.28	35.20	3.01	1.01	20.20	9.39	45.47	38.57	507.78	636.15	4.05	3.81
CL07PH1 7	2.78	40.90	2.97	1.10	7.64	3.70	18.53	12.45	480.88	604.33	2.62	3.06
CL14PH1 14	3.01	44.00	2.94	1.16	6.69	3.82	21.63	13.44	565.88	699.65	2.46	2.71
CL28PH1 28	3.10	46.00	2.94	1.14	5.80	5.26	18.11	11.75	626.15	458.98	2.61	2.65
CL99PH1 29	2.89	43.00	2.95	1.13	*	*	*	*	*	*	*	*
CL56PH1 56	*	43.40	2.90	1.15	7.01	3.20	20.53	12.32	647.50	775.20	2.36	2.77
CL99PH2 121	3.21	47.40	2.93	1.17	*	*	*	*	*	*	*	*
CL99PH3 230	3.12	46.90	2.93	1.17	*	*	*	*	*	*	*	*
CL99PH4 362	3.15	47.30	2.92	1.17	*	*	*	*	*	*	*	*
CL99PH5 499	3.85	54.20	2.90	1.27	*	*	*	*	*	*	*	*
CL99PH6 625	3.36	48.10	2.88	1.20	*	*	*	*	*	*	*	*
CL99PH7 719	3.14	46.20	2.89	1.19	8.28	*	19.42	*	657.83	*	*	*
				PHENOL	1.0% 50°C							
CH01PL1 1	2.03	31.40	3.00	1.01	32.66	15.57	64.40	52.81	515.55	581.88	5.56	5.65
CH07PL1 7	2.21	35.20	2.87	1.05	26.56	13.76	65.35	47.46	523.25	479.25	6.04	5.88
CH14PL1 14	2.20	35.10	2.94	1.06	23.70	10.64	57.89	36.23	509.35	471.20	5.83	5.86
CH99PL1 28	2.53	40.30	2.85	1.09	*	*	*	*	*	*	*	*
CH28PL1 28	2.52	39.70	2.88	1.08	24.49	11.57	52.95	31.63	469.70	444.65	5.88	5.89
CH56PL1 56	2.71	42.50	2.81	1.15	21.01	10.47	44.61	26.13	526.50	448.70	5.08	5.26
CH99PL2 122	3.32	54.30	2.82	1.19	*	*	*	*	*	*	*	*
CH99PL3 245	4.08	62.40	2.79	1.27	*	*	*	*	*	*	*	*
CH99PL4 363	4.48	72.70	2.80	1.29	*	*	*	*	*	*	*	*
CH99PL5 499	4.63	71.40	2.79	1.29	*	*	*	*	*	*	*	*
CH99PL6 625	4.87	74.70	2.79	1.30	*	*	*	*	*	*	*	*
CH99PL7 721	4.86	68.10	2.78	1.29	30.50	*	49.61	*	393.42	*	*	*
				PHENOL	1.0% 23°C							
CL01PL1 1	2.04	31.50	3.01	1.00	34.17	16.48	60.22	49.05	484.13	564.00	5.88	5.69
CL07PL1 7	2.01	31.20	3.01	1.01	32.83	15.75	60.03	52.97	481.20	600.90	6.86	6.68
CL14PL1 14	2.10	32.40	3.01	1.01	29.97	14.08	59.77	52.35	534.18	649.30	6.36	6.15
CL28PL1 28	2.14	33.00	*	1.02	26.78	12.62	60.69	48.60	603.40	663.88	6.29	6.05
CL99PL1 28	2.36	36.00	3.03	1.04	*	*	*	*	*	*	*	*
CL56PL1 56	2.16	33.40	3.01	1.03	24.45	11.72	54.74	41.63	596.58	617.60	5.47	5.33
CL99PL2 122	2.71	39.90	3.00	1.11	*	*	*	*	*	*	*	*
CL99PL3 233	2.78	41.40	2.98	1.13	*	*	*	*	*	*	*	*
CL99PL4 363	2.83	42.20	2.99	1.13	*	*	*	*	*	*	*	*
CL99PL5 499	2.86	42.40	2.98	1.13	*	*	*	*	*	*	*	*
CL99PL6 626	2.93	42.90	2.98	1.14	*	*	*	*	*	*	*	*
CL99PL7 720	2.94	43.70	2.98	1.14	21.87	*	48.33	*	615.42	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 4.0% 50^oC												
CH01PM1 1	2.21	34.20	2.98	1.02	20.82	9.92	51.34	46.24	538.05	629.04	4.62	4.45
CH07PM1 7	2.60	41.40	2.77	1.12	14.35	7.22	29.64	19.91	402.43	423.30	4.86	4.59
CH14PM1 14	2.76	43.60	2.76	1.14	10.70	4.22	28.85	14.58	490.98	447.83	4.26	3.90
CH28PM1 28	3.11	48.60	2.73	1.20	12.52	6.33	26.12	13.92	455.25	404.48	4.17	3.64
CH99PM1 29	2.96	47.40	2.77	1.14	*	*	*	*	*	*	*	*
CH56PM1 56	3.47	53.80	2.73	1.24	11.26	5.56	23.48	13.24	510.90	484.58	3.86	2.99
CH99PM2 121	3.99	63.20	2.74	1.26	*	*	*	*	*	*	*	*
CH99PM3 244	4.72	92.50	2.71	1.28	*	*	*	*	*	*	*	*
CH99PM4 362	4.97	86.30	2.70	1.28	*	*	*	*	*	*	*	*
CH99PM5 499	5.38	*	2.69	1.28	*	*	*	*	*	*	*	*
CH99PM6 624	5.56	90.20	2.69	1.28	*	*	*	*	*	*	*	*
CH99PM7 720	5.59	101.10	2.69	1.27	15.30	*	30.76	*	660.08	*	*	*
PHENOL 4.0% 23^oC												
CL01PM1 1	2.07	32.00	3.01	1.00	30.26	14.35	57.06	48.87	495.68	594.78	5.88	5.84
CL07PM1 7	2.07	31.70	3.02	1.02	19.77	9.62	48.37	36.90	539.65	591.60	5.83	5.58
CL14PM1 14	2.37	35.80	3.03	1.05	11.42	5.13	31.60	24.63	491.60	580.44	4.47	4.63
CL28PM1 28	2.54	38.00	3.00	1.08	12.24	6.10	32.09	18.35	555.48	533.10	3.81	4.02
CL99PM1 29	2.13	32.90	3.02	1.02	*	*	*	*	*	*	*	*
CL56PM1 56	*	48.90	2.96	1.12	10.96	5.67	32.28	19.35	679.75	651.18	3.38	3.43
CL99PM2 121	2.31	35.10	3.03	1.05	*	*	*	*	*	*	*	*
CL99PM3 231	2.44	37.00	3.03	1.07	*	*	*	*	*	*	*	*
CL99PM4 362	2.62	39.00	3.04	1.10	*	*	*	*	*	*	*	*
CL99PM5 499	2.95	42.60	2.98	1.15	*	*	*	*	*	*	*	*
CL99PM6 625	3.14	44.80	2.96	1.17	*	*	*	*	*	*	*	*
CL99PM7 719	3.20	46.40	2.95	1.18	12.07	*	32.53	*	673.08	*	*	*
SODIUM CHLORIDE 35.0% 50^oC												
CH01SH1 1	1.95	30.00	3.01	1.00	34.61	*	54.47	*	516.25	*	6.62	6.14
CH07SH1 7	2.02	31.00	3.00	1.01	31.58	14.42	50.86	39.82	525.30	650.10	6.65	6.02
CH14SH1 14	2.03	31.70	2.99	1.00	*	*	*	*	*	*	6.54	6.61
CH99SH1 28	2.06	32.00	2.99	1.01	*	*	*	*	*	*	*	*
CH28SH1 28	2.01	31.20	3.01	1.00	40.14	17.06	63.38	50.46	484.50	675.90	6.70	6.58
CH56SH1 56	2.02	32.00	2.99	1.00	33.14	15.66	54.10	44.86	566.40	649.80	6.80	7.96
CH99SH2 131	2.06	31.90	2.98	1.01	*	*	*	*	*	*	*	*
CH99SH3 253	2.06	31.70	2.98	1.02	*	*	*	*	*	*	*	*
CH99SH4 379	2.05	31.80	2.99	1.02	*	*	*	*	*	*	*	*
CH99SH5 510	2.06	31.70	2.97	1.01	*	*	*	*	*	*	*	*
CH99SH6 630	2.05	31.80	2.98	1.01	*	*	*	*	*	*	*	*
CH99SH7 733	2.05	32.00	2.98	1.02	39.00	*	54.61	*	521.42	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM CHLORIDE 35.0% 23°C												
CL01SH1 1	2.02	31.20	3.00	1.00	30.82	14.26	51.18	47.06	589.80	861.60	8.04	7.43
CL07SH1 7	1.99	30.50	3.01	1.01	34.14	16.18	54.35	47.94	487.00	640.70	6.54	6.54
CL14SH1 14	1.99	30.80	3.01	1.00	*	*	*	*	*	*	6.42	6.79
CL28SH1 28	1.99	31.10	3.00	1.00	38.82	20.10	62.18	53.86	489.25	599.90	7.04	6.80
CL99SH1 28	2.02	31.20	3.00	1.01	*	*	*	*	*	*	*	*
CL56SH1 56	2.03	31.60	3.00	1.01	30.46	13.38	53.26	43.66	554.70	708.50	6.94	6.77
CL99SH2 131	2.03	31.10	3.01	1.01	*	*	*	*	*	*	*	*
CL99SH3 246	2.03	31.20	3.02	1.02	*	*	*	*	*	*	*	*
CL99SH4 379	2.03	31.40	3.02	1.02	*	*	*	*	*	*	*	*
CL99SH5 510	2.04	31.20	3.01	1.01	*	*	*	*	*	*	*	*
CL99SH6 630	2.03	31.10	3.01	1.01	*	*	*	*	*	*	*	*
CL99SH7 733	2.03	31.50	3.01	1.02	37.52	*	57.66	*	568.33	*	*	*
SODIUM CHLORIDE 10.0% 50°C												
CH01SM1 1	1.99	31.10	2.99	1.01	36.94	16.46	56.58	43.58	451.20	559.80	7.62	6.42
CH07SM1 7	1.96	31.00	2.98	1.01	36.14	17.62	55.22	44.10	465.20	536.20	7.93	7.70
CH14SM1 14	35.24	31.80	7.48	6.95	34.62	17.46	57.90	45.70	488.20	540.20	7.94	6.14
CH99SM1 28	2.12	32.90	2.99	1.02	*	*	*	*	*	*	*	*
CH28SM1 28	35.39	32.30	7.46	6.89	29.34	15.70	54.70	45.22	564.10	683.00	7.82	6.58
CH56SM1 61	35.78	32.80	7.50	6.92	37.10	19.94	55.90	46.78	412.40	489.20	9.02	6.90
CH99SM2 132	2.11	32.50	2.98	1.02	*	*	*	*	*	*	*	*
CH99SM3 254	2.10	32.60	2.98	1.02	*	*	*	*	*	*	*	*
CH99SM4 370	2.15	32.50	2.98	1.03	*	*	*	*	*	*	*	*
CH99SM5 511	2.10	32.40	2.98	1.02	*	*	*	*	*	*	*	*
CH99SM6 624	2.09	32.60	2.97	1.02	*	*	*	*	*	*	*	*
CH99SM7 734	2.08	32.50	2.98	1.03	37.88	*	50.73	*	505.83	*	*	*
SODIUM CHLORIDE 10.0% 23°C												
CL01SM1 1	1.96	30.60	3.00	1.01	33.66	15.14	52.34	42.22	469.50	581.20	6.78	6.02
CL07SM1 7	2.03	31.60	3.00	1.01	37.82	18.78	55.46	48.78	415.00	565.30	8.62	7.27
CL14SM1 14	34.88	31.50	7.43	6.96	35.42	15.86	58.78	50.78	467.90	600.50	7.62	6.42
CL28SM1 28	35.43	32.00	7.44	6.98	36.42	15.82	59.26	51.02	486.50	720.60	7.26	6.34
CL99SM1 28	2.07	31.80	3.01	1.02	*	*	*	*	*	*	*	*
CL56SM1 61	35.37	32.10	7.44	6.97	35.38	16.86	56.90	46.54	452.70	558.40	8.10	6.74
CL99SM2 132	2.09	32.10	3.01	1.02	*	*	*	*	*	*	*	*
CL99SM3 246	2.09	32.20	3.02	1.03	*	*	*	*	*	*	*	*
CL99SM4 370	2.09	32.20	3.02	1.02	*	*	*	*	*	*	*	*
CL99SM5 511	2.08	31.90	3.02	1.02	*	*	*	*	*	*	*	*
CL99SM6 624	2.08	32.10	3.01	1.02	*	*	*	*	*	*	*	*
CL99SM7 734	2.07	32.10	3.02	1.02	37.92	*	53.73	*	492.50	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
					WATER	100.0%	50°C						
CH01WP1	1	2.02	31.50	3.00	1.01	33.78	16.50	55.42	49.86	472.10	638.90	7.22	6.02
CH07WP1	7	2.16	33.90	2.98	1.02	37.06	18.22	72.74	56.18	483.60	492.60	7.02	6.52
CH14WP1	14	38.42	37.30	7.69	6.88	40.60	18.82	63.70	45.42	343.90	403.00	7.18	6.06
CH99WP1	28	2.47	39.10	2.97	1.06	*	*	*	*	*	*	*	*
CH28WP1	28	2.37	37.20	2.98	1.05	32.25	15.62	63.00	36.34	406.00	338.60	6.94	6.18
CH56WP1	56	45.30	39.30	7.91	7.32	35.02	0.33	62.30	35.06	411.20	311.10	6.94	5.98
CH99WP2	132	3.06	49.20	2.93	1.12	*	*	*	*	*	*	*	*
CH99WP3	254	3.58	56.50	2.90	1.17	*	*	*	*	*	*	*	*
CH99WP4	370	4.01	62.50	2.90	1.19	*	*	*	*	*	*	*	*
CH99WP5	503	4.20	67.80	2.91	1.21	*	*	*	*	*	*	*	*
CH99WP6	622	4.30	69.20	2.88	1.21	*	*	*	*	*	*	*	*
CH99WP7	734	4.33	69.90	2.89	1.21	29.47	*	47.73	*	347.25	*	*	*
					WATER	100.0%	23°C						
CL01WP1	1	2.00	31.10	3.00	1.01	35.10	16.86	56.14	48.06	472.10	582.10	7.42	6.22
CL07WP1	7	2.05	31.30	3.01	1.01	36.70	17.46	60.94	52.06	505.10	632.50	7.02	6.10
CL14WP1	14	35.02	31.70	7.46	6.95	35.94	18.06	59.50	49.30	453.20	586.50	7.14	6.82
CL28WP1	28	2.15	32.80	3.01	1.02	35.82	17.14	60.62	47.26	484.20	543.70	7.26	6.42
CL99WP1	28	2.10	32.30	3.00	1.02	*	*	*	*	*	*	*	*
CL56WP1	56	37.58	32.10	7.55	7.25	35.66	17.46	61.74	48.78	521.60	540.50	6.82	5.86
CL99WP2	132	2.23	34.40	3.01	1.03	*	*	*	*	*	*	*	*
CL99WP3	246	2.27	35.20	3.03	1.06	*	*	*	*	*	*	*	*
CL99WP4	370	2.32	35.70	3.01	1.04	*	*	*	*	*	*	*	*
CL99WP5	503	2.35	36.20	3.01	1.04	*	*	*	*	*	*	*	*
CL99WP6	622	2.36	36.40	3.01	1.04	*	*	*	*	*	*	*	*
CL99WP7	734	2.38	37.00	3.01	1.04	37.18	*	65.53	*	526.00	*	*	*
					POTASSIUM DICHROMATE	10.0%	50°C						
CH01XM1	1	2.04	31.50	3.00	1.01	36.50	16.10	62.82	48.30	476.70	678.20	7.26	6.34
CH07XM1	7	2.10	32.70	3.05	1.00	30.58	15.70	53.90	41.78	588.10	557.10	6.50	7.24
CH14XM1	14	2.15	34.10	2.98	1.03	36.02	17.58	59.66	45.38	478.90	498.80	6.68	6.78
CH99XM1	28	2.19	34.60	2.95	1.03	*	*	*	*	*	*	*	*
CH28XM1	28	2.15	33.90	3.06	1.00	32.34	15.06	54.30	38.94	514.00	530.80	6.50	6.30
CH56XM1	56	2.18	35.00	2.95	1.31	35.26	18.86	60.86	45.86	445.30	537.30	6.96	5.44
CH99XM2	118	2.28	36.30	2.94	1.04	*	*	*	*	*	*	*	*
CH99XM3	231	2.31	36.50	3.00	1.04	*	*	*	*	*	*	*	*
CH99XM4	363	2.33	37.30	2.93	1.04	*	*	*	*	*	*	*	*
CH99XM5	489	2.32	37.10	2.93	1.04	*	*	*	*	*	*	*	*
CH99XM6	609	2.31	36.80	2.93	1.04	*	*	*	*	*	*	*	*
CH99XM7	711	2.34	37.70	2.93	1.05	37.63	*	58.13	*	487.25	*	*	*

CHLORINATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
POTASSIUM DICHROMATE 10.0% 23°C												
CL01XM1 1	2.03	31.10	3.00	1.01	36.62	18.58	63.42	49.90	585.10	514.40	7.22	7.32
CL07XM1 7	2.01	30.90	3.01	1.01	33.66	15.82	55.14	50.30	503.40	710.60	6.88	7.22
CL14XM1 14	2.06	32.00	3.01	1.02	35.38	18.30	60.90	48.22	489.30	524.40	7.86	6.50
CL28XM1 28	2.04	31.70	3.02	1.01	33.42	15.50	60.06	46.10	535.50	642.50	6.90	6.44
CL99XM1 28	2.11	32.50	3.00	1.01	*	*	*	*	*	*	*	*
CL56XM1 56	2.10	32.70	3.01	1.02	33.78	15.10	58.54	46.38	492.60	641.80	6.84	6.07
CL99XM2 118	2.18	33.60	3.00	1.02	*	*	*	*	*	*	*	*
CL99XM3 223	2.21	34.30	3.00	1.02	*	*	*	*	*	*	*	*
CL99XM4 363	2.25	34.60	3.00	1.02	*	*	*	*	*	*	*	*
CL99XM5 489	2.27	35.00	3.00	1.02	*	*	*	*	*	*	*	*
CL99XM6 609	2.25	34.80	3.00	1.03	*	*	*	*	*	*	*	*
CL99XM7 711	2.27	35.20	3.01	1.03	36.23	*	60.38	*	612.75	*	*	*

CPE : STATISTICS

CHLORINATED POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

		NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
HYDROCHLORIC ACID 10.0% 50°C													
CH01AM1	1	5	2.406	5	2.456	5	26.555	5	48.838	5	1.540	5	0.303
CH07AM1	7	*	*	*	*	*	*	*	*	*	*	*	*
CH14AM1	14	5	3.727	5	3.003	5	42.750	5	32.459	5	0.555	5	0.303
CH28AM1	29	5	1.915	5	4.413	5	19.190	5	16.030	10	0.733	10	0.520
CH56AM1	56	5	3.660	5	3.180	5	24.050	5	25.987	5	0.228	5	0.767
HYDROCHLORIC ACID 10.0% 23°C													
CL01AM1	1	5	2.260	5	2.960	5	*	5	67.480	5	0.240	5	0.167
CL07AM1	7	*	*	*	*	*	*	*	*	*	*	*	*
CL14AM1	14	5	1.570	5	1.905	5	27.917	5	70.430	5	0.374	5	0.385
CL28AM1	29	5	1.910	5	3.216	5	59.740	5	65.370	9	0.308	10	0.392
CL56AM1	56	5	3.579	5	2.170	5	50.710	5	18.260	5	0.326	5	0.228
SODIUM HYDROXIDE 10.0% 50°C													
CH01BM1	1	5	4.100	5	2.000	5	*	5	36.300	10	0.100	10	0.270
CH07BM1	7	5	1.770	5	1.993	5	60.420	5	52.277	5	52.277	10	0.231
CH14BM1	14	5	1.130	5	2.090	5	22.600	5	23.090	10	0.207	10	0.250
CH28BM1	28	5	0.975	5	2.720	5	43.530	5	43.190	8	0.100	8	0.390
CH56BM1	56	5	4.598	5	1.601	5	21.350	5	31.440	7	0.107	10	0.313
SODIUM HYDROXIDE 10.0% 23°C													
CL01BM1	1	5	2.120	5	2.880	5	59.370	5	55.100	10	0.380	9	0.440
CL07BM1	7	5	4.430	5	1.880	5	40.730	5	24.960	10	0.158	10	0.327
CL14BM1	14	5	4.280	5	1.970	5	33.790	5	47.960	10	0.270	10	0.390
CL28BM1	28	5	1.450	5	0.687	5	50.210	5	26.190	10	0.700	10	0.260
CL56BM1	56	5	1.260	5	2.130	5	38.540	5	35.760	7	0.458	7	0.668
1 2 DICHLOROETHANE .8% 50°C													
CH01DH1	1	5	1.412	5	0.689	5	42.373	5	34.900	5	0.169	5	0.048
CH07DH1	7	5	3.774	5	2.400	5	31.327	5	37.210	5	0.058	5	0.072
CH14DH1	14	4	3.036	4	1.347	4	8.852	4	12.917	5	0.330	5	0.270
CH28DH1	29	5	4.253	5	1.704	5	97.512	5	87.314	5	0.821	5	0.382
CH56DH1	56	5	1.463	5	0.522	5	15.309	5	36.213	5	0.426	5	0.303
1 2 DICHLOROETHANE .8% 23°C													
CL01DH1	1	5	1.424	5	0.936	5	32.717	5	61.826	5	0.351	5	0.107
CL07DH1	7	5	5.870	5	3.170	5	72.470	5	69.000	5	0.080	5	0.090
CL14DH1	14	5	4.415	5	2.110	5	58.700	5	36.280	5	0.273	5	0.300
CL28DH1	29	4	2.013	5	2.127	4	80.717	5	53.450	5	0.381	5	0.043
CL56DH1	56	5	0.322	5	0.393	5	11.613	5	5.498	5	0.091	5	0.125

CHLORINATED POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
1 2 DICHLOROETHANE .1% 50°C												
CH01DL1 1	5	1.082	5	1.335	5	23.230	5	26.665	5	0.114	5	0.091
CH07DL1 7	5	1.520	5	3.410	5	18.630	5	20.140	5	0.110	5	0.100
CH14DL1 14	5	2.840	5	1.650	5	30.090	5	31.360	5	0.110	5	0.200
CH28DL1 29	5	4.217	5	0.924	5	18.922	5	22.123	5	0.092	5	0.107
CH56DL1 56	5	1.071	5	0.547	5	12.948	5	9.090	5	0.261	5	0.169
1 2 DICHLOROETHANE .1% 23°C												
CL01DL1 1	5	1.258	5	1.133	5	34.653	5	20.061	5	0.145	5	0.110
CL07DL1 7	5	1.640	5	0.560	5	19.050	5	11.990	5	0.110	5	0.300
CL14DL1 14	5	0.380	5	1.390	5	15.390	5	25.420	5	0.050	5	0.050
CL28DL1 29	5	2.800	5	2.016	5	34.411	5	33.012	5	0.048	5	0.048
CL56DL1 56	5	2.920	5	2.852	5	22.390	5	53.210	5	0.264	5	0.152
1 2 DICHLOROETHANE .5% 50°C												
CH01DM1 1	5	0.937	5	0.479	5	43.340	5	15.169	5	0.185	5	0.091
CH07DM1 7	5	4.760	5	1.780	5	70.850	5	58.400	5	0.150	5	0.098
CH14DM1 14	5	0.600	5	0.940	5	16.300	5	21.860	5	0.220	5	0.080
CH28DM1 29	5	0.501	5	0.705	5	11.640	5	25.335	5	0.246	5	0.079
CH56DM1 56	5	0.351	5	1.149	5	6.110	5	10.443	5	0.682	5	0.233
1 2 DICHLOROETHANE .5% 23°C												
CL01DM1 1	5	2.571	5	1.048	5	36.888	5	22.341	5	0.068	5	0.054
CL07DM1 7	5	5.350	5	0.760	5	20.700	5	7.070	5	0.096	5	0.080
CL14DM1 14	5	0.536	5	1.290	5	29.808	5	32.890	5	0.040	5	0.060
CL28DM1 29	5	1.964	5	1.394	5	19.832	5	36.844	5	0.209	5	0.093
CL56DM1 56	5	2.358	5	0.818	5	29.369	5	21.391	5	0.060	5	0.162
FURFURAL 8.0% 50°C												
CH01FH1 1	5	2.460	5	3.131	5	22.360	5	77.860	5	0.239	5	0.268
CH07FH1 7	5	1.165	5	0.449	5	97.790	5	99.940	5	0.257	5	0.114
CH14FH1 14	5	0.570	5	0.164	5	78.300	5	41.800	5	0.065	5	0.041
CH28FH1 28	5	1.188	5	0.274	5	*	5	94.840	5	0.071	5	0.024
CH56FH1 56	5	0.826	5	0.410	5	*	5	*	5	0.089	5	0.068
FURFURAL 8.0% 23°C												
CL01FH1 1	5	2.970	5	2.987	5	41.800	5	82.160	5	0.313	5	0.233
CL07FH1 7	5	0.934	5	1.254	5	*	5	*	5	0.041	5	0.061
CL14FH1 14	5	0.231	5	0.447	5	*	5	*	5	0.057	5	0.036
CL28FH1 28	5	0.377	5	0.436	5	80.510	5	*	5	0.061	5	0.076
CL56FH1 56	5	0.573	5	0.399	5	86.570	5	*	5	0.063	5	0.112

CHLORINATED POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
FURFURAL 1.0% 50°C												
CH01FL1 1	5	1.992	5	1.592	5	21.282	5	29.498	5	0.115	5	1.850
CH07FL1 7	5	4.106	5	4.929	5	52.870	5	57.990	5	0.318	5	0.087
CH14FL1 14	5	3.094	5	2.538	5	57.010	5	36.300	5	0.107	5	0.311
CH28FL1 28	5	4.913	5	3.662	5	50.300	5	56.680	5	1.141	5	0.074
CH56FL1 56	5	4.400	5	3.890	5	55.600	5	68.800	5	0.176	5	0.177
FURFURAL 1.0% 23°C												
CL01FL1 1	5	2.995	5	1.634	5	51.850	5	30.961	5	0.376	5	0.429
CL07FL1 7	5	3.460	5	3.867	5	14.430	5	37.500	5	0.917	5	0.378
CL14FL1 14	5	2.265	5	3.554	5	60.170	5	67.450	5	0.409	5	0.321
CL28FL1 28	5	1.876	5	2.496	5	42.920	5	55.950	5	0.148	5	0.104
CL56FL1 56	5	2.493	5	3.553	5	44.220	5	76.400	5	0.067	5	0.203
FURFURAL 4.0% 50°C												
CH01FM1 1	5	1.391	5	2.210	5	47.692	5	83.612	5	0.150	5	0.246
CH07FM1 7	5	2.674	5	2.970	5	*	5	59.690	5	0.219	5	0.285
CH14FM1 14	5	1.059	5	3.674	5	29.550	5	12.250	5	0.172	5	0.214
CH28FM1 28	5	1.375	5	0.522	5	35.810	5	61.580	5	0.319	5	0.143
CH56FM1 56	5	2.234	5	1.170	5	57.270	5	67.990	5	0.554	5	0.961
FURFURAL 4.0% 23°C												
CL01FM1 1	5	3.500	5	2.301	5	55.090	5	46.916	5	0.476	5	0.749
CL07FM1 7	5	1.983	5	1.951	5	65.420	5	96.720	5	0.093	5	0.128
CL14FM1 14	5	1.647	5	2.720	5	77.800	5	62.910	5	0.167	5	0.182
CL28FM1 28	5	2.515	5	3.255	5	58.370	5	*	5	0.652	5	0.108
CL56FM1 56	5	1.329	5	1.204	5	39.370	5	34.710	5	0.154	5	0.120
METHYL ETHYL KETONE 8.0% 50°C												
CH01MD1 1	5	0.380	5	0.430	5	30.930	5	50.760	5	0.200	5	0.260
CH07MD1 7	5	3.230	5	1.494	5	76.840	5	73.700	5	0.226	5	0.744
CH14MD1 14	5	2.790	5	1.320	5	44.030	5	27.820	5	0.120	5	0.178
CH28MD1 28	5	2.140	5	0.915	5	80.760	5	19.299	5	0.135	5	0.098
CH56MD1 58	5	4.300	5	0.655	5	42.720	5	17.080	5	0.258	5	0.100

CHLORINATED POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
METHYL ETHYL KETONE 8.0% 23°C												
CL01MD1 1	5	2.550	5	3.320	5	67.760	5	91.405	5	0.110	5	0.140
CL07MD1 7	5	4.439	5	0.729	5	44.796	5	26.315	5	0.101	5	0.198
CL14MD1 14	5	1.630	5	1.660	5	13.230	5	22.390	5	0.106	5	0.250
CL28MD1 28	4	0.979	4	2.190	4	38.868	4	73.520	5	0.170	5	0.180
CL56MD1 56	5	1.830	5	0.701	5	32.440	5	22.440	5	0.194	5	0.192
METHYL ETHYL KETONE 26.0% 50°C												
CH01MH1 1	4	0.200	1	*	4	52.696	1	*	3	0.153	3	0.100
METHYL ETHYL KETONE 26.0% 23°C												
CL01MH1 1	5	0.170	5	0.141	5	37.100	5	*	5	0.230	5	0.140
METHYL ETHYL KETONE 3.0% 50°C												
CH01ML1 1	5	2.520	3	2.043	5	84.630	3	44.397	5	0.420	5	0.110
CH07ML1 7	5	6.367	5	1.800	5	75.610	5	26.300	5	0.149	5	0.210
CH14ML1 14	5	1.980	5	0.980	5	29.300	5	35.300	5	0.063	5	0.215
CH28ML1 28	5	2.176	5	2.229	5	26.503	5	43.108	5	0.051	5	0.185
CH56ML1 55	5	1.720	5	0.577	5	31.100	5	14.100	5	0.070	5	0.430
METHYL ETHYL KETONE 3.0% 23°C												
CL01ML2 1	5	2.980	5	3.250	5	43.200	5	44.500	5	0.090	5	0.170
CL01ML1 1	5	2.580	5	1.720	5	19.700	5	34.400	5	0.260	5	0.180
CL07ML1 7	5	3.046	5	1.900	5	31.470	5	18.904	5	0.239	5	0.142
CL14ML1 14	5	2.250	5	1.180	5	97.400	5	27.930	5	0.100	5	0.039
CL28ML1 28	4	2.065	5	1.491	4	*	5	37.017	5	0.644	5	0.130
CL56ML1 55	5	4.590	5	1.260	5	55.130	5	31.360	5	0.160	5	0.297
METHYL ETHYL KETONE 13.0% 50°C												
CH01MM1 1	5	1.706	4	1.865	5	78.350	4	*	5	0.390	5	0.170
CH07MM1 7	3	1.501	3	0.503	3	59.779	3	29.956	3	*	3	*
CH14MM1 14	5	0.981	5	0.233	5	44.600	5	73.970	5	0.055	5	0.105
CH28MM1 28	4	0.790	5	0.792	4	30.899	5	49.397	5	0.449	5	0.316
CH56MM1 55	4	0.075	5	0.160	4	60.280	5	48.400	5	0.446	5	0.074
METHYL ETHYL KETONE 13.0% 23°C												
CL01MM1 1	5	0.740	5	0.390	5	86.030	5	53.180	5	0.180	5	0.170
CL01MM2 1	5	1.090	5	1.320	5	91.210	5	62.250	5	0.260	5	0.260
CL07MM1 7	5	1.884	5	0.990	5	38.651	5	87.600	5	0.443	5	0.529
CL14MM1 14	5	0.561	5	0.761	5	32.110	5	48.122	5	0.103	5	0.144
CL28MM1 28	5	1.290	4	0.404	5	33.500	4	38.138	5	0.291	5	0.298
CL56MM1 55	5	1.640	5	2.150	5	55.260	5	*	5	0.417	5	0.120

CHLORINATED POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				ASTM #2 OIL SATURATED 50°C								
CH010M1 1	5	1.879	5	1.367	5	27.923	5	36.062	5	*	5	0.228
CH070M1 7	5	2.520	5	1.853	5	43.803	5	45.690	5	0.590	5	0.110
CH140M1 14	5	1.613	5	3.060	5	20.080	5	36.105	5	1.205	5	0.167
CH280M1 28	5	3.536	5	1.643	5	51.600	5	45.000	5	0.400	5	0.300
CH560M1 56	5	2.935	5	2.295	5	68.844	5	45.075	5	0.219	5	0.167
				ASTM #2 OIL SATURATED 23°C								
CL010M1 1	5	3.905	5	1.126	5	75.126	5	53.185	5	0.089	5	0.219
CL070M1 7	5	4.125	5	5.129	5	55.025	5	82.800	5	0.953	5	0.460
CL140M1 13	5	1.820	5	2.463	5	9.667	5	35.113	5	0.872	5	1.020
CL280M1 28	5	*	5	*	5	48.750	5	11.750	5	0.200	5	0.100
CL560M1 56	5	1.735	4	4.305	5	19.641	4	93.897	5	0.805	5	0.167
				ASTM #2 OIL 100.0% 50°C								
CH010P1 1	4	1.800	4	1.628	4	35.656	4	21.004	5	0.090	5	0.190
CH070P1 7	5	2.584	5	1.643	5	47.500	5	52.300	5	0.300	5	0.200
CH140P1 14	5	1.074	5	2.939	5	32.740	5	48.905	5	0.100	5	0.200
CH280P1 28	5	1.187	4	1.887	5	47.920	4	62.135	5	0.390	5	0.432
CH560P1 56	4	1.636	5	1.452	3	26.312	5	20.724	5	0.297	5	0.374
				ASTM #2 OIL 100.0% 23°C								
CL010P1 1	5	2.598	5	1.374	5	6.175	5	34.682	5	*	5	0.167
CL070P1 7	5	2.269	5	2.404	5	37.106	5	31.542	5	0.200	5	0.200
CL140P1 14	5	1.581	5	1.140	5	37.900	5	27.300	5	0.100	5	0.080
CL280P1 28	5	3.684	3	4.588	5	52.887	3	80.117	5	0.713	5	0.089
CL560P1 56	3	1.039	5	1.894	3	20.599	5	32.909	5	0.402	5	0.228
				PHENOL 8.0% 50°C								
CH01PH1 1	5	0.868	5	1.353	5	24.219	5	32.814	5	0.076	5	0.045
CH07PH1 7	5	0.615	5	0.373	5	25.769	5	23.584	5	1.550	5	0.215
CH14PH1 14	5	1.226	5	0.754	5	32.382	5	43.713	5	0.076	5	0.020
CH28PH1 28	5	2.248	5	2.826	5	*	5	*	5	0.119	5	0.052
CH56PH1 56	5	0.407	5	2.925	5	24.180	5	65.989	5	0.115	5	0.050
				PHENOL 8.0% 23°C								
CL01PH1 1	5	2.213	5	2.077	5	18.285	5	35.192	5	0.163	5	0.041
CL07PH1 7	5	0.692	5	0.670	5	32.809	5	20.318	5	0.014	5	0.112
CL14PH1 14	5	1.716	5	0.846	5	28.265	5	75.808	5	0.052	5	0.042
CL28PH1 28	5	6.681	5	3.134	5	*	5	85.547	5	0.127	5	0.139
CL56PH1 56	5	1.251	5	1.672	5	44.084	5	67.638	5	0.029	5	0.058

CHLORINATED POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				PHENOL 1.0% 50°C								
CH01PL1 1	5	1.782	5	4.514	5	23.467	5	43.557	5	0.107	5	0.165
CH07PL1 7	5	4.435	5	2.285	5	25.514	5	20.797	5	0.121	5	0.169
CH14PL1 14	5	4.133	5	3.415	5	20.566	5	22.875	5	0.084	5	0.113
CH28PL1 28	5	2.957	5	1.952	5	29.683	5	27.976	5	0.069	5	0.101
CH56PL1 56	5	1.142	5	1.741	5	25.581	5	29.018	5	0.170	5	0.196
				PHENOL 1.0% 23°C								
CL01PL1 1	5	3.732	5	1.176	5	32.411	5	14.968	5	0.272	5	0.057
CL07PL1 7	5	4.481	5	1.898	5	43.641	5	21.633	5	0.179	5	0.158
CL14PL1 14	5	4.060	5	2.150	5	37.260	5	16.110	5	0.169	5	0.138
CL28PL1 28	5	1.752	5	2.589	5	13.799	5	38.242	5	0.270	5	0.141
CL56PL1 56	5	1.902	5	1.614	5	8.420	5	27.054	5	0.112	5	0.199
				PHENOL 4.0% 50°C								
CH01PM1 1	5	1.282	4	2.200	5	28.400	4	31.029	5	0.091	5	0.117
CH07PM1 7	5	1.465	5	1.043	5	15.067	5	10.469	5	0.078	5	0.169
CH14PM1 14	5	3.253	5	1.428	5	52.501	5	39.271	5	0.076	5	0.066
CH28PM1 28	5	0.988	5	0.850	5	21.484	5	20.182	5	0.074	5	0.091
CH56PM1 56	5	1.894	5	0.300	5	35.583	5	9.551	5	0.116	5	0.028
				PHENOL 4.0% 23°C								
CL01PM1 1	5	2.755	5	3.032	5	30.931	5	36.090	5	0.077	5	0.084
CL07PM1 7	5	4.094	5	3.279	5	38.050	5	41.722	5	0.186	5	0.277
CL14PM1 14	5	7.600	5	4.190	5	53.600	5	56.730	5	0.172	5	0.119
CL28PM1 28	5	4.250	5	1.170	5	74.504	5	21.858	5	0.062	5	0.089
CL56PM1 56	5	2.315	5	0.947	5	28.651	5	15.625	5	0.048	5	0.054
				SODIUM CHLORIDE 35.0% 50°C								
CH01SH1 1	4	3.626	*	*	4	43.117	*	*	5	0.169	5	0.167
CH07SH1 7	5	2.030	5	2.820	5	39.700	5	43.729	4	0.191	5	0.109
CH14SH1 14	*	*	*	*	*	*	*	*	5	0.310	5	0.176
CH28SH1 28	5	2.027	5	3.819	5	58.857	5	51.230	5	0.473	5	0.133
CH56SH1 56	5	3.050	5	3.254	5	52.230	5	53.639	5	0.216	5	1.070
				SODIUM CHLORIDE 35.0% 23°C								
CL01SH1 1	5	4.115	5	1.500	5	67.448	5	20.558	5	0.249	5	0.502
CL07SH1 7	4	4.297	5	3.761	4	95.669	5	49.920	5	0.089	5	0.219
CL14SH1 14	*	*	*	*	*	*	*	*	10	0.169	9	0.145
CL28SH1 28	5	1.368	5	2.917	4	23.139	5	36.015	10	0.165	10	0.287
CL56SH1 56	5	1.345	5	1.479	5	21.076	5	42.714	10	0.685	9	0.424

CHLORINATED POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				SODIUM CHLORIDE 10.0% 50°C								
CH01SM1 1	5	2.680	5	2.480	5	46.130	5	58.770	5	0.540	5	0.410
CH07SM1 7	5	1.246	5	1.980	5	43.537	5	56.877	7	0.535	6	0.876
CH14SM1 14	5	1.310	5	1.620	5	15.400	5	35.380	5	0.590	5	0.167
CH28SM1 28	5	2.550	5	1.600	5	43.790	5	16.390	5	0.110	5	0.110
CH56SM1 61	5	3.170	5	1.680	5	70.200	5	19.570	5	0.300	5	0.240
				SODIUM CHLORIDE 10.0% 23°C								
CL01SM1 1	5	2.150	5	1.530	5	30.700	5	30.500	5	0.870	5	0.300
CL07SM1 7	5	3.488	5	4.021	5	51.731	5	67.084	6	0.325	6	0.731
CL14SM1 14	5	2.110	5	2.400	5	13.000	5	32.690	5	0.610	5	0.230
CL28SM1 28	5	1.930	5	0.890	5	25.400	5	18.870	5	0.090	5	0.090
CL56SM1 61	5	3.720	5	1.860	5	27.600	5	13.970	5	0.420	5	0.650
				WATER 100.0% 50°C								
CH01WP1 1	5	1.741	5	1.967	5	28.057	5	39.695	5	0.303	5	0.179
CH07WP1 7	5	2.605	5	2.500	5	34.492	5	35.300	8	0.270	5	0.230
CH14WP1 14	6	4.800	5	3.810	6	41.400	5	57.360	5	0.230	5	0.220
CH28WP1 28	4	2.877	5	0.620	4	27.401	5	15.670	5	0.300	5	0.230
CH56WP1 56	5	2.960	5	1.040	5	43.790	5	16.010	5	0.260	5	0.110
				WATER 100.0% 23°C								
CL01WP1 1	5	2.490	5	1.310	5	31.970	5	13.850	5	0.230	5	0.110
CL07WP1 7	5	2.300	5	1.670	5	26.440	5	43.200	5	0.110	5	0.200
CL14WP1 14	5	3.250	5	3.760	5	36.500	5	69.000	5	0.170	5	0.270
CL28WP1 28	5	1.980	5	2.710	5	24.560	5	48.490	5	0.167	5	0.179
CL56WP1 56	5	2.040	5	2.530	5	41.680	5	38.370	5	0.335	5	0.090
				POTASSIUM DICHROMATE 10.0% 50°C								
CH01XM1 1	5	2.720	5	5.380	5	46.970	5	*	10	0.160	5	0.370
CH07XM1 7	5	2.100	5	3.530	5	20.482	5	57.200	10	0.430	10	0.542
CH14XM1 14	5	2.310	5	2.650	5	29.370	5	31.100	10	0.720	10	0.330
CH28XM1 28	5	1.790	5	2.460	5	15.122	5	26.500	10	0.330	10	0.210
CH56XM1 56	5	2.651	5	0.953	5	42.495	5	78.033	7	0.251	7	0.223
				POTASSIUM DICHROMATE 10.0% 23°C								
CL01XM1 1	5	1.560	5	3.280	5	65.700	5	37.980	10	0.330	10	0.380
CL07XM1 7	5	2.368	5	1.840	5	25.567	5	37.940	10	0.200	10	0.460
CL14XM1 14	5	1.980	5	3.000	5	20.000	5	53.490	9	0.750	10	0.710
CL28XM1 28	5	1.860	5	1.170	5	20.580	5	42.150	10	0.340	10	0.190
CL56XM1 56	5	1.750	5	3.800	5	79.400	5	49.700	7	0.220	7	0.140

CPE :   RETENTION OF PROPERTIES

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
HYDROCHLORIC ACID 10.0% 50°C											
CH01AM1 1	100.0	100.0	100.0	86	116	102	108	119	88	102	109
CH07AM1 7	2.9	.3	.1	*	*	*	*	*	*	*	*
CH14AM1 14	4.0	4.4	4.4	99	121	119	109	98	74	109	121
CH99AM1 28	4.1	7.4	7.3	*	*	*	*	*	*	*	*
CH28AM1 29	4.2	5.2	5.6	105	115	122	102	86	61	119	130
CH56AM1 56	4.5	6.1	6.8	109	125	141	129	92	74	110	137
CH99AM2 144	10.0	11.9	12.6	*	*	*	*	*	*	*	*
CH99AM3 252	14.7	19.4	20.9	*	*	*	*	*	*	*	*
CH99AM4 368	15.6	16.8	18.8	*	*	*	*	*	*	*	*
CH99AM5 511	19.2	21.0	22.8	*	*	*	*	*	*	*	*
CH99AM6 621	20.4	22.6	24.8	*	*	*	*	*	*	*	*
CH99AM7 732	25.2	29.4	32.3	89	*	94	*	69	*	*	*
HYDROCHLORIC ACID 10.0% 23°C											
CL01AM1 1	.5	.7	.1	96	116	102	98	116	90	96	104
CL07AM1 7	1.2	.3	.7	*	*	*	*	*	*	*	*
CL14AM1 14	1.8	1.6	1.8	96	102	101	100	102	103	92	114
CL28AM1 29	1.8	1.6	2.1	105	112	112	108	102	101	95	111
CL99AM1 31	1.5	1.6	2.0	*	*	*	*	*	*	*	*
CL56AM1 56	2.2	2.9	3.6	99	113	112	109	101	93	105	125
CL99AM2 144	2.6	2.3	2.5	*	*	*	*	*	*	*	*
CL99AM3 238	2.2	2.3	3.2	*	*	*	*	*	*	*	*
CL99AM4 368	2.7	2.6	3.0	*	*	*	*	*	*	*	*
CL99AM5 511	2.8	1.6	1.4	*	*	*	*	*	*	*	*
CL99AM6 621	2.6	2.3	2.9	*	*	*	*	*	*	*	*
CL99AM7 732	3.2	3.6	4.6	103	*	107	*	95	*	*	*
SODIUM HYDROXIDE 10.0% 50°C											
CH01BM1 1	100.0	100.0	100.0	87	90	100	101	114	115	98	114
CH07BM1 7	2.8	3.8	3.4	52	124	92	107	118	79	92	113
CH14BM1 14	3.2	4.2	4.0	96	118	116	102	115	80	101	101
CH28BM1 28	3.0	5.5	4.6	100	109	110	101	106	90	96	101
CH99BM1 29	4.2	6.1	5.3	*	*	*	*	*	*	*	*
CH56BM1 56	3.8	6.2	6.0	107	202	121	129	101	90	80	113
CH99BM2 144	3.7	6.1	5.2	*	*	*	*	*	*	*	*
CH99BM3 252	4.9	7.4	6.4	*	*	*	*	*	*	*	*
CH99BM4 368	7.6	6.7	6.4	*	*	*	*	*	*	*	*
CH99BM5 510	5.8	7.1	6.2	*	*	*	*	*	*	*	*
CH99BM6 622	6.4	10.3	9.9	*	*	*	*	*	*	*	*
CH99BM7 732	9.3	12.8	12.6	104	*	98	*	86	*	*	*
SODIUM HYDROXIDE 10.0% 23°C											
CL01BM1 1	.3	.3	.2	110	111	116	115	101	102	110	117
CL07BM1 7	.8	.3	.6	99	102	120	117	122	121	105	116

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
SODIUM HYDROXIDE 10.0% 23°C											
CL14BM1 14	1.0	.6	1.0	94	104	108	109	104	100	95	106
CL99BM1 28	1.6	1.6	2.0	*	*	*	*	*	*	*	*
CL28BM1 28	1.7	1.9	2.4	85	102	103	97	122	89	93	104
CL56BM1 56	2.4	2.3	3.3	53	95	90	93	112	99	110	127
CL99BM2 144	1.8	2.3	2.8	*	*	*	*	*	*	*	*
CL99BM3 238	1.1	2.3	2.9	*	*	*	*	*	*	*	*
CL99BM4 368	1.0	1.6	1.7	*	*	*	*	*	*	*	*
CL99BM5 510	.7	1.3	1.0	*	*	*	*	*	*	*	*
CL99BM6 622	.2	1.6	2.0	*	*	*	*	*	*	*	*
CL99BM7 732	.3	1.6	1.8	114	*	110	*	99	*	*	*
1 2 DICHLOROETHANE .8% 50°C											
CH01DH1 1	15.1	17.4	15.6	27	32	42	37	160	151	46	51
CH07DH1 7	23.3	27.2	28.2	30	41	54	58	148	127	61	76
CH14DH1 14	32.4	36.2	38.5	31	37	51	39	129	104	45	70
CH99DH1 28	37.1	48.1	56.3	*	*	*	*	*	*	*	*
CH28DH1 29	119.3	99.7	127.8	17	29	21	21	90	84	48	41
CH56DH1 56	53.5	60.3	70.4	31	41	42	34	101	79	71	74
CH99DH2 133	81.8	93.0	118.5	*	*	*	*	*	*	*	*
CH99DH3 244	125.0	131.2	160.9	*	*	*	*	*	*	*	*
CH99DH4 364	132.6	142.4	178.9	*	*	*	*	*	*	*	*
CH99DH5 495	154.2	178.3	219.2	*	*	*	*	*	*	*	*
CH99DH6 629	167.4	182.8	233.3	*	*	*	*	*	*	*	*
CH99DH7 726	131.6	136.3	176.3	52	*	67	*	91	*	*	*
1 2 DICHLOROETHANE .8% 23°C											
CL01DH1 1	14.0	10.0	12.3	24	26	39	29	157	152	43	48
CL07DH1 7	17.1	15.1	18.8	15	23	23	30	142	174	58	70
CL14DH1 14	17.0	15.2	19.9	25	31	41	33	139	128	37	24
CL99DH1 28	8.6	8.1	10.9	*	*	*	*	*	*	*	*
CL28DH1 29	26.6	24.7	32.5	16	27	22	27	114	116	42	53
CL56DH1 56	27.0	23.0	32.4	30	33	43	32	103	91	50	61
CL99DH2 134	35.7	31.3	45.4	*	*	*	*	*	*	*	*
CL99DH3 231	39.1	31.3	46.6	*	*	*	*	*	*	*	*
CL99DH4 364	49.6	41.6	61.8	*	*	*	*	*	*	*	*
CL99DH5 495	64.8	56.5	83.2	*	*	*	*	*	*	*	*
CL99DH6 630	107.8	108.4	146.4	*	*	*	*	*	*	*	*
CL99DH7 725	182.3	175.2	284.4	19	*	28	*	93	*	*	*
1 2 DICHLOROETHANE .1% 50°C											
CH01DL1 1	3.7	4.1	4.2	74	74	100	105	132	131	86	101
CH07DL1 7	11.7	14.0	16.1	65	69	114	90	134	95	77	98
CH14DL1 14	14.2	16.5	19.6	67	70	103	67	110	75	71	95
CH99DL1 28	21.6	25.4	29.4	*	*	*	*	*	*	*	*
CH28DL1 29	22.8	25.3	29.9	53	57	89	60	120	82	69	89
CH56DL1 56	30.7	34.8	40.8	81	80	104	71	86	61	84	96

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				1 2 DICHLOROETHANE .1% 50°C							
CH99DL2 139	53.5	61.0	73.8	*	*	*	*	*	*	*	*
CH99DL3 246	79.7	85.7	106.6	*	*	*	*	*	*	*	*
CH99DL4 366	106.3	108.3	139.5	*	*	*	*	*	*	*	*
CH99DL5 496	116.9	122.2	156.5	*	*	*	*	*	*	*	*
CH99DL6 631	120.7	126.0	163.1	*	*	*	*	*	*	*	*
CH99DL7 728	123.0	132.7	170.2	87	*	90	*	62	*	*	*
				1 2 DICHLOROETHANE .1% 23°C							
CL01DL1 1	1.2	.6	1.3	79	81	101	95	122	120	91	104
CL07DL1 7	3.5	3.5	4.7	69	74	95	106	132	139	80	95
CL14DL1 14	5.5	5.2	6.5	59	62	85	80	135	128	64	82
CL99DL1 28	5.2	5.1	6.7	*	*	*	*	*	*	*	*
CL28DL1 29	7.7	6.8	8.9	51	51	78	61	143	120	66	79
CL56DL1 56	8.7	8.7	11.3	65	66	96	86	123	105	80	96
CL99DL2 136	12.0	11.5	15.3	*	*	*	*	*	*	*	*
CL99DL3 233	15.3	15.1	20.6	*	*	*	*	*	*	*	*
CL99DL4 366	17.9	17.0	22.4	*	*	*	*	*	*	*	*
CL99DL5 496	19.3	18.6	25.0	*	*	*	*	*	*	*	*
CL99DL6 632	20.4	19.9	65.7	*	*	*	*	*	*	*	*
CL99DL7 727	22.0	21.5	29.5	85	*	90	*	80	*	*	*
				1 2 DICHLOROETHANE .5% 50°C							
CH01DM1 1	11.4	14.7	13.3	43	49	64	62	148	146	55	70
CH07DM1 7	20.6	25.0	25.1	41	47	73	61	145	115	64	78
CH14DM1 14	29.2	32.7	35.6	40	45	59	44	113	91	59	75
CH99DM1 28	32.0	40.3	44.1	*	*	*	*	*	*	*	*
CH28DM1 29	31.9	36.0	41.0	41	48	60	48	112	90	59	70
CH56DM1 56	42.6	47.2	54.5	50	56	66	53	92	75	79	80
CH99DM3 245	81.0	94.6	111.4	*	*	*	*	*	*	*	*
CH99DM4 365	95.0	108.3	130.0	*	*	*	*	*	*	*	*
CH99DM5 496	119.0	150.2	175.0	*	*	*	*	*	*	*	*
CH99DM6 630	135.9	157.2	189.9	*	*	*	*	*	*	*	*
CH99DM7 727	140.3	168.7	198.9	86	*	88	*	65	*	*	*
				1 2 DICHLOROETHANE .5% 23°C							
CL01DM1 1	5.4	4.9	5.6	51	57	79	83	139	147	68	88
CL07DM1 7	11.0	8.7	12.1	33	42	57	60	157	156	59	68
CL14DM1 14	14.1	11.9	15.8	34	38	53	45	141	136	49	59
CL99DM1 28	10.9	10.0	13.1	*	*	*	*	*	*	*	*
CL28DM1 29	17.2	14.8	20.2	32	36	53	40	130	64	54	64
CL56DM1 56	18.8	15.5	22.0	40	41	63	48	109	97	63	73
CL99DM2 135	17.2	16.1	21.9	*	*	*	*	*	*	*	*
CL99DM3 233	23.4	21.5	30.0	*	*	*	*	*	*	*	*
CL99DM4 365	24.1	24.1	33.2	*	*	*	*	*	*	*	*
CL99DM5 496	35.1	33.8	46.4	*	*	*	*	*	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
1 2 DICHLOROETHANE .5% 23°C											
CL99DM6 631	39.4	34.7	50.1	*	*	*	*	*	*	*	*
CL99DM7 726	50.6	44.4	64.6	41	*	53	*	94	*	*	*
FURFURAL 8.0% 50°C											
CH01FH1 1	3.4	4.5	4.6	84	93	103	109	124	126	50	80
CH07FH1 7	87.6	79.0	104.6	7	10	13	8	185	162	22	43
CH14FH1 14	125.1	109.8	144.5	5	7	9	5	215	171	17	20
CH28FH1 28	160.7	136.3	183.8	6	7	10	6	156	135	17	17
CH99FH1 28	154.3	166.6	204.8	*	*	*	*	*	*	*	*
CH56FH1 56	191.3	169.4	216.9	5	7	10	6	168	152	16	15
CH99FH2 117	190.0	196.1	237.7	*	*	*	*	*	*	*	*
CH99FH3 236	212.0	183.4	250.4	*	*	*	*	*	*	*	*
CH99FH4 350	193.6	180.5	246.6	*	*	*	*	*	*	*	*
CH99FH5 485	138.7	172.1	237.8	*	*	*	*	*	*	*	*
CH99FH6 616	211.6	185.1	273.4	*	*	*	*	*	*	*	*
CH99FH7 712	215.3	188.6	369.3	22	*	15	*	43	*	*	*
FURFURAL 8.0% 23°C											
CL01FH1 1	.8	.6	.9	94	105	107	111	112	110	57	96
CL07FH1 7	61.3	49.7	70.6	6	10	11	11	219	184	17	17
CL14FH1 14	112.3	78.0	123.8	3	4	5	4	254	255	12	13
CL99FH1 28	130.6	93.0	154.4	*	*	*	*	*	*	*	*
CL28FH1 28	113.6	81.3	138.1	5	8	9	6	195	142	13	13
CL56FH1 56	149.6	103.8	175.7	4	7	7	5	159	160	15	17
CL99FH2 114	174.5	114.7	199.4	*	*	*	*	*	*	*	*
CL99FH3 219	155.1	109.9	190.5	*	*	*	*	*	*	*	*
CL99FH4 350	179.6	113.4	198.0	*	*	*	*	*	*	*	*
CL99FH5 485	129.5	95.5	148.3	*	*	*	*	*	*	*	*
CL99FH6 617	151.4	99.0	154.8	*	*	*	*	*	*	*	*
CL99FH7 712	157.6	119.8	208.9	5	*	10	*	174	*	*	*
FURFURAL 1.0% 50°C											
CH01FL1 1	3.9	4.6	4.9	77	80	98	84	122	101	99	129
CH07FL1 7	12.7	17.2	18.1	59	64	87	73	149	117	82	101
CH14FL1 14	18.9	24.2	25.4	61	65	87	65	119	90	80	104
CH28FL1 28	25.9	29.9	33.9	57	65	109	75	146	92	84	97
CH99FL1 28	27.9	35.6	38.9	*	*	*	*	*	*	*	*
CH56FL1 56	40.4	43.8	53.0	53	59	89	58	137	89	71	81
CH99FL2 123	69.2	71.5	90.3	*	*	*	*	*	*	*	*
CH99FL3 241	105.3	104.2	137.4	*	*	*	*	*	*	*	*
CH99FL4 355	125.1	131.1	172.3	*	*	*	*	*	*	*	*
CH99FL5 489	145.2	142.6	186.9	*	*	*	*	*	*	*	*
CH99FL6 621	155.2	138.5	181.1	*	*	*	*	*	*	*	*
CH99FL7 718	142.8	133.0	175.9	63	*	72	*	71	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
					FURFURAL	1.0% 23°C						
CL01FL1	1	1.2	1.4	1.5	88	88	98	90	107	101	108	171
CL07FL1	7	3.6	3.2	4.2	61	73	86	90	141	133	109	104
CL14FL1	14	6.2	4.9	6.5	65	65	97	90	159	143	85	109
CL99FL1	28	6.5	6.4	8.1	*	*	*	*	*	*	*	*
CL28FL1	28	8.3	7.5	10.5	61	66	92	87	138	127	77	96
CL56FL1	56	11.4	9.6	14.0	54	59	86	84	157	147	67	83
CL99FL2	123	13.5	12.5	16.8	*	*	*	*	*	*	*	*
CL99FL3	224	19.2	17.7	25.2	*	*	*	*	*	*	*	*
CL99FL4	355	25.4	22.2	30.8	*	*	*	*	*	*	*	*
CL99FL5	489	29.4	24.8	35.2	*	*	*	*	*	*	*	*
CL99FL6	622	33.2	28.9	40.8	*	*	*	*	*	*	*	*
CL99FL7	717	35.2	31.2	44.5	66	*	85	*	101	*	*	*
					FURFURAL	4.0% 50°C						
CH01FM1	1	13.9	13.9	14.2	30	35	49	40	147	143	60	85
CH07FM1	7	29.8	32.3	35.8	25	35	39	38	151	147	54	59
CH14FM1	14	42.2	44.0	49.7	24	27	35	31	117	99	49	68
CH28FM1	28	66.4	63.0	76.0	20	25	33	24	117	106	46	56
CH99FM1	29	73.0	77.2	89.5	*	*	*	*	*	*	*	*
CH56FM1	56	105.9	97.4	123.9	21	29	31	22	100	75	51	74
CH99FM2	124	147.4	148.2	192.2	*	*	*	*	*	*	*	*
CH99FM3	242	151.9	148.2	202.6	*	*	*	*	*	*	*	*
CH99FM4	356	147.4	145.9	188.9	*	*	*	*	*	*	*	*
CH99FM5	490	145.4	147.2	191.3	*	*	*	*	*	*	*	*
CH99FM6	622	151.3	154.4	321.2	*	*	*	*	*	*	*	*
CH99FM7	719	156.1	159.9	217.6	51	*	40	*	67	*	*	*
					FURFURAL	4.0% 23°C						
CL01FM1	1	3.5	4.3	4.6	63	67	83	73	118	109	90	151
CL07FM1	7	15.9	14.1	17.8	28	31	50	45	171	205	53	70
CL14FM1	14	20.3	19.2	23.2	24	29	47	33	166	156	47	57
CL28FM1	28	31.5	27.9	35.4	21	25	37	30	132	134	46	53
CL99FM1	29	23.3	20.8	27.9	*	*	*	*	*	*	*	*
CL56FM1	56	36.5	31.3	42.5	22	27	39	28	159	133	40	54
CL99FM2	124	45.0	39.0	54.2	*	*	*	*	*	*	*	*
CL99FM3	228	55.4	47.6	69.5	*	*	*	*	*	*	*	*
CL99FM4	356	80.3	63.6	98.0	*	*	*	*	*	*	*	*
CL99FM5	490	97.3	70.3	111.3	*	*	*	*	*	*	*	*
CL99FM6	623	112.8	81.8	130.6	*	*	*	*	*	*	*	*
CL99FM7	715	121.2	93.0	154.1	21	*	43	*	116	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
METHYL ETHYL KETONE 8.0% 50°C											
CH01MD1 1	23.7	32.7	34.8	15	21	23	18	158	153	47	51
CH07MD1 7	72.1	77.9	89.2	25	30	40	31	125	117	59	86
CH14MD1 14	85.0	87.8	106.0	36	42	44	30	95	77	38	44
CH28MD1 28	79.2	85.8	102.4	31	41	41	29	102	74	61	69
CH56MD1 58	75.5	88.7	100.5	56	68	78	46	108	62	84	88
METHYL ETHYL KETONE 8.0% 23°C											
CL01MD1 1	7.0	8.6	9.4	42	46	66	59	140	140	77	84
CL07MD1 7	17.9	21.4	28.1	25	30	52	43	179	172	63	80
CL14MD1 14	24.2	25.0	32.5	49	58	66	52	129	102	42	52
CL28MD1 28	25.7	26.1	34.9	30	34	49	38	124	116	56	77
CL56MD1 56	25.5	26.5	33.5	45	49	73	52	126	92	74	96
METHYL ETHYL KETONE 26.0% 50°C											
CH01MH1 1	135.8	106.1	160.9	1	3	1	2	56	58	10	8
CH99MH1 28	288.0	327.2	401.3	*	*	*	*	*	*	*	*
CH99MH2 122	408.2	343.4	465.0	*	*	*	*	*	*	*	*
CH99MH3 240	374.7	422.3	478.1	*	*	*	*	*	*	*	*
CH99MH4 358	252.8	316.8	315.4	*	*	*	*	*	*	*	*
CH99MH5 494	260.4	353.1	329.2	*	*	*	*	*	*	*	*
CH99MH6 626	207.4	280.9	241.9	*	*	*	*	*	*	*	*
CH99MH7 722	192.8	361.2	308.7	7	*	8	*	80	*	*	*
METHYL ETHYL KETONE 26.0% 23°C											
CL01MH1 1	70.6	66.8	100.1	3	3	3	1	77	89	14	15
CL99MH1 28	202.4	190.4	289.8	*	*	*	*	*	*	*	*
CL99MH2 121	453.3	289.1	537.7	*	*	*	*	*	*	*	*
CL99MH3 235	260.5	240.8	387.2	*	*	*	*	*	*	*	*
CL99MH4 358	335.0	256.3	416.9	*	*	*	*	*	*	*	*
CL99MH5 494	316.4	221.5	370.1	*	*	*	*	*	*	*	*
CL99MH6 627	296.2	327.7	473.6	*	*	*	*	*	*	*	*
CL99MH7 721	268.4	237.0	359.7	2	*	4	*	115	*	*	*
METHYL ETHYL KETONE 3.0% 50°C											
CH01ML1 1	6.1	8.7	8.4	56	59	87	71	138	111	82	92
CH07ML1 7	24.8	32.6	34.2	46	53	76	61	131	104	75	99
CH14ML1 14	31.1	38.2	41.1	53	64	67	50	103	78	65	81
CH28ML1 28	10.6	11.1	15.7	54	64	78	62	106	81	82	98
CH99ML1 28	38.0	50.6	54.3	*	*	*	*	*	*	*	*
CH56ML1 55	45.0	52.1	59.1	75	84	99	67	105	67	104	114
CH99ML2 120	88.3	107.7	126.2	*	*	*	*	*	*	*	*
CH99ML3 240	114.4	126.9	159.2	*	*	*	*	*	*	*	*
CH99ML4 358	150.8	153.8	201.4	*	*	*	*	*	*	*	*
CH99ML5 494	184.1	229.8	294.3	*	*	*	*	*	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
METHYL ETHYL KETONE 3.0% 50°C											
CH99ML6 626	209.6	250.6	320.0	*	*	*	*	*	*	*	*
CH99ML7 722	219.1	219.6	282.7	52	*	53	*	61	*	*	*
METHYL ETHYL KETONE 3.0% 23°C											
CL01ML1 1	1.8	2.4	2.6	81	86	107	113	139	142	99	115
CL01ML2 1	1.4	1.9	2.1	79	78	99	97	130	129	94	115
CL07ML1 7	5.4	5.9	8.0	56	58	86	87	148	154	77	93
CL14ML1 14	7.7	7.3	10.3	62	69	74	68	122	111	67	83
CL99ML1 28	9.0	8.6	11.4	*	*	*	*	*	*	*	*
CL28ML1 28	31.0	37.5	42.1	67	73	83	77	140	95	75	85
CL56ML1 55	12.3	12.0	15.5	63	65	105	73	136	91	83	105
CL99ML2 120	17.4	15.0	20.6	*	*	*	*	*	*	*	*
CL99ML3 235	23.0	21.7	30.1	*	*	*	*	*	*	*	*
CL99ML4 358	31.1	27.8	40.4	*	*	*	*	*	*	*	*
CL99ML5 494	36.1	31.0	44.3	*	*	*	*	*	*	*	*
CL99ML6 627	39.7	35.1	49.0	*	*	*	*	*	*	*	*
CL99ML7 721	41.3	36.7	52.9	54	*	71	*	102	*	*	*
METHYL ETHYL KETONE 13.0% 50°C											
CH01MM1 1	42.3	48.9	53.7	10	16	15	14	147	129	35	38
CH07MM1 7	100.0	100.0	100.0	7	11	12	9	122	117	20	21
CH14MM1 14	208.8	204.7	256.6	7	9	10	6	132	100	18	20
CH99MM1 28	47.3	55.4	62.5	*	*	*	*	*	*	*	*
CH28MM1 28	54.4	50.3	69.4	12	17	20	15	123	94	47	49
CH56MM1 55	207.8	226.1	262.2	6	8	9	6	142	103	21	20
CH99MM2 120	208.2	220.5	250.7	*	*	*	*	*	*	*	*
CH99MM3 239	314.9	271.8	421.3	*	*	*	*	*	*	*	*
CH99MM4 357	351.7	401.9	523.5	*	*	*	*	*	*	*	*
CH99MM5 493	318.5	100.0	100.0	*	*	*	*	*	*	*	*
CH99MM6 625	305.4	370.2	451.4	*	*	*	*	*	*	*	*
CH99MM7 721	308.6	261.9	328.1	16	*	26	*	118	*	*	*
METHYL ETHYL KETONE 13.0% 23°C											
CL01MM1 1	19.4	22.1	28.6	14	15	21	13	160	154	26	37
CL01MM2 1	19.9	23.4	27.9	14	18	22	16	192	172	29	37
CL07MM1 7	47.0	45.8	65.9	15	17	32	20	182	171	37	64
CL14MM1 14	64.0	54.5	79.5	11	14	16	11	135	118	22	26
CL28MM1 28	184.8	195.5	242.7	21	27	33	24	118	97	63	67
CL99MM1 28	81.7	70.2	106.7	*	*	*	*	*	*	*	*
CL56MM1 55	89.7	78.6	116.8	17	24	32	22	131	102	47	54
CL99MM2 120	131.4	101.0	169.5	*	*	*	*	*	*	*	*
CL99MM3 234	191.6	259.0	300.8	*	*	*	*	*	*	*	*
CL99MM4 357	205.1	237.2	279.5	*	*	*	*	*	*	*	*
CL99MM5 493	205.0	100.0	100.0	*	*	*	*	*	*	*	*
CL99MM6 626	203.3	227.6	251.6	*	*	*	*	*	*	*	*
CL99MM7 720	206.0	232.4	257.8	9	*	19	*	128	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				ASTM #2 OIL	SATURATED	50°C					
CH010M1 1	2.7	3.6	3.9	83	93	96	97	124	125	89	108
CH070M1 7	9.1	43.2	45.7	83	88	94	90	113	106	102	112
CH140M1 14	11.9	13.6	13.1	78	77	91	80	124	123	112	119
CH990M1 28	19.4	23.1	27.3	*	*	*	*	*	*	*	*
CH280M1 28	19.1	21.2	24.3	67	63	93	93	106	94	79	89
CH560M1 56	27.5	29.3	27.5	80	79	93	74	106	95	83	93
CH990M2 128	52.9	100.0	100.0	*	*	*	*	*	*	*	*
CH990M3 251	80.6	92.8	116.5	*	*	*	*	*	*	*	*
CH990M4 364	97.0	101.0	130.2	*	*	*	*	*	*	*	*
CH990M5 503	114.9	120.8	156.5	*	*	*	*	*	*	*	*
CH990M6 626	124.1	130.3	171.4	*	*	*	*	*	*	*	*
CH990M7 727	134.9	141.7	185.8	80	*	81	*	61	*	*	*
				ASTM #2 OIL	SATURATED	23°C					
CL010M1 1	.6	.6	.8	84	92	97	102	120	125	91	107
CL070M1 7	2.1	1.9	2.5	89	101	100	101	109	118	113	111
CL140M1 13	6.1	6.0	7.1	80	84	95	95	128	131	111	120
CL990M1 28	5.0	5.5	6.9	*	*	*	*	*	*	*	*
CL280M1 28	5.4	4.9	5.5	67	63	93	93	128	128	84	95
CL560M1 56	6.5	6.2	8.3	84	86	96	96	111	113	101	107
CL990M2 128	11.5	11.0	13.9	*	*	*	*	*	*	*	*
CL990M3 237	13.6	14.0	18.1	*	*	*	*	*	*	*	*
CL990M4 364	16.0	15.6	19.6	*	*	*	*	*	*	*	*
CL990M5 503	17.1	16.6	20.2	*	*	*	*	*	*	*	*
CL990M6 626	18.6	18.8	23.8	*	*	*	*	*	*	*	*
CL990M7 727	20.5	20.8	26.3	89	*	102	*	91	*	*	*
				ASTM #2 OIL	100.0%	50°C					
CH010P1 1	1.7	1.7	1.8	72	73	84	81	130	129	78	93
CH070P1 7	5.0	5.5	5.7	78	71	92	90	106	110	79	90
CH140P1 14	7.3	7.1	8.7	90	92	100	95	107	104	81	87
CH990P1 28	9.8	10.6	13.3	*	*	*	*	*	*	*	*
CH280P1 28	8.0	8.5	9.6	81	79	87	89	94	114	80	93
CH560P1 56	11.4	12.3	14.0	91	83	100	92	100	105	94	110
CH990P2 141	15.7	17.4	21.1	*	*	*	*	*	*	*	*
CH990P3 257	18.8	19.9	24.4	*	*	*	*	*	*	*	*
CH990P4 385	18.6	21.2	26.4	*	*	*	*	*	*	*	*
CH990P5 509	19.5	20.9	25.6	*	*	*	*	*	*	*	*
CH990P6 627	20.3	20.9	26.0	*	*	*	*	*	*	*	*
CH990P7 733	20.3	22.5	28.6	99	*	94	*	73	*	*	*
				ASTM #2 OIL	100.0%	23°C					
CL010P1 1	.7	.3	.5	76	78	92	86	137	142	81	93
CL070P1 7	.7	.6	.6	93	98	108	106	122	115	84	92
CL140P1 14	1.0	1.3	1.0	75	69	96	94	132	125	85	97

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				ASTM #2 OIL 100.0% 23°C							
CL990P1 28	1.3	1.3	1.6	*	*	*	*	*	*	*	*
CL280P1 28	1.0	.3	.7	89	88	103	104	113	116	105	109
CL560P1 56	1.6	1.0	.7	92	97	104	104	119	120	100	118
CL990P2 141	2.7	2.3	3.3	*	*	*	*	*	*	*	*
CL990P3 244	3.1	3.3	4.5	*	*	*	*	*	*	*	*
CL990P4 385	4.2	3.9	5.7	*	*	*	*	*	*	*	*
CL990P5 509	5.1	4.6	5.8	*	*	*	*	*	*	*	*
CL990P6 627	6.5	4.2	6.0	*	*	*	*	*	*	*	*
CL990P7 733	5.7	6.8	8.9	101	*	98	*	90	*	*	*
				PHENOL 8.0% 50°C							
CH01PH1 1	27.0	26.8	30.6	26	29	49	43	125	117	39	50
CH07PH1 7	65.5	62.0	78.2	21	23	29	21	92	81	37	46
CH14PH1 14	85.5	83.2	104.1	15	13	30	17	122	95	38	37
CH28PH1 28	104.0	132.1	158.5	20	25	28	20	112	90	38	38
CH99PH1 29	89.5	97.1	121.4	*	*	*	*	*	*	*	*
CH56PH1 56	149.5	100.0	100.0	20	24	28	20	116	100	34	35
CH99PH2 121	162.2	256.9	304.4	*	*	*	*	*	*	*	*
CH99PH3 243	210.3	318.0	365.1	*	*	*	*	*	*	*	*
CH99PH4 362	228.8	320.3	361.0	*	*	*	*	*	*	*	*
CH99PH5 499	241.8	100.0	100.0	*	*	*	*	*	*	*	*
CH99PH6 624	217.9	220.3	263.8	*	*	*	*	*	*	*	*
CH99PH7 720	196.6	210.6	246.2	14	*	28	*	144	*	*	*
				PHENOL 8.0% 23°C							
CL01PH1 1	12.6	12.8	13.8	53	55	84	82	116	110	54	62
CL07PH1 7	43.1	35.9	48.2	20	22	34	26	110	104	35	50
CL14PH1 14	55.0	47.2	65.9	18	22	40	29	129	121	33	44
CL28PH1 28	54.7	48.4	65.9	15	31	34	25	143	79	35	43
CL99PH1 29	43.6	38.3	52.8	*	*	*	*	*	*	*	*
CL56PH1 56	100.0	48.6	65.5	18	19	38	26	148	134	31	45
CL99PH2 121	59.4	52.4	73.0	*	*	*	*	*	*	*	*
CL99PH3 230	54.9	50.8	71.3	*	*	*	*	*	*	*	*
CL99PH4 362	56.6	52.1	72.3	*	*	*	*	*	*	*	*
CL99PH5 499	91.1	74.3	112.5	*	*	*	*	*	*	*	*
CL99PH6 625	66.8	54.7	78.1	*	*	*	*	*	*	*	*
CL99PH7 719	55.9	48.6	69.1	23	*	33	*	115	*	*	*
				PHENOL 1.0% 50°C							
CH01PL1 1	3.5	3.6	4.1	86	92	119	112	118	100	74	93
CH07PL1 7	13.6	17.3	17.8	70	81	121	101	120	83	81	96
CH14PL1 14	18.4	21.9	26.4	62	63	107	77	117	81	78	96
CH99PL1 28	26.2	30.8	36.4	*	*	*	*	*	*	*	*
CH28PL1 28	25.6	28.1	32.6	64	68	98	67	107	77	78	97
CH56PL1 56	39.4	41.7	52.1	55	62	83	56	120	77	68	86

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
PHENOL 1.0% 50°C											
CH99PL2 122	65.6	76.3	98.6	*	*	*	*	*	*	*	*
CH99PL3 245	103.0	102.6	141.0	*	*	*	*	*	*	*	*
CH99PL4 363	123.3	136.0	185.9	*	*	*	*	*	*	*	*
CH99PL5 499	130.8	131.8	179.7	*	*	*	*	*	*	*	*
CH99PL6 625	142.7	142.5	195.1	*	*	*	*	*	*	*	*
CH99PL7 721	142.2	121.1	166.5	83	*	84	*	69	*	*	*
PHENOL 1.0% 23°C											
CL01PL1 1	.9	1.0	1.2	90	97	112	104	111	97	78	93
CL07PL1 7	3.1	3.3	4.2	86	93	111	113	110	104	91	109
CL14PL1 14	4.6	3.8	5.3	79	83	111	111	122	112	85	101
CL28PL1 28	7.8	7.1	100.0	70	74	112	103	138	114	84	99
CL99PL1 28	17.3	16.1	23.2	*	*	*	*	*	*	*	*
CL56PL1 56	11.1	11.3	15.2	64	69	101	89	137	106	73	87
CL99PL2 122	34.5	28.7	43.6	*	*	*	*	*	*	*	*
CL99PL3 233	38.0	33.5	50.8	*	*	*	*	*	*	*	*
CL99PL4 363	40.6	36.1	54.3	*	*	*	*	*	*	*	*
CL99PL5 499	41.9	36.8	55.1	*	*	*	*	*	*	*	*
CL99PL6 626	45.3	38.4	57.1	*	*	*	*	*	*	*	*
CL99PL7 720	45.9	41.0	60.9	60	*	82	*	107	*	*	*
PHENOL 4.0% 50°C											
CH01PM1 1	9.8	10.3	11.7	55	58	95	98	123	108	62	73
CH07PM1 7	29.7	33.5	37.6	38	42	55	42	92	73	65	75
CH14PM1 14	39.4	42.0	48.7	28	25	53	31	112	77	57	64
CH28PM1 28	54.7	56.8	70.1	33	37	48	30	104	70	56	60
CH99PM1 29	47.9	53.4	62.7	*	*	*	*	*	*	*	*
CH56PM1 56	87.3	88.1	113.0	30	33	43	28	117	84	51	49
CH99PM2 121	99.3	104.5	135.6	*	*	*	*	*	*	*	*
CH99PM3 244	136.0	199.4	248.0	*	*	*	*	*	*	*	*
CH99PM4 362	148.5	179.3	222.6	*	*	*	*	*	*	*	*
CH99PM5 499	169.2	100.0	100.0	*	*	*	*	*	*	*	*
CH99PM6 624	178.1	191.9	235.9	*	*	*	*	*	*	*	*
CH99PM7 720	179.5	227.2	274.0	42	*	52	*	115	*	*	*
PHENOL 4.0% 23°C											
CL01PM1 1	3.1	3.2	3.3	80	84	106	104	113	103	78	96
CL07PM1 7	12.2	11.2	14.2	52	57	90	79	123	102	78	91
CL14PM1 14	17.7	14.7	21.3	30	30	59	52	112	100	60	76
CL28PM1 28	26.9	22.6	31.5	32	36	59	39	127	92	51	66
CL99PM1 29	5.8	5.8	7.8	*	*	*	*	*	*	*	*
CL56PM1 56	100.0	63.5	80.2	29	33	60	41	156	112	45	56
CL99PM2 121	14.9	12.9	18.0	*	*	*	*	*	*	*	*
CL99PM3 231	21.4	19.0	27.5	*	*	*	*	*	*	*	*
CL99PM4 362	30.2	25.4	37.9	*	*	*	*	*	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
					PHENOL 4.0% 23°C							
CL99PM5	499	46.7	37.0	55.3	*	*	*	*	*	*	*	*
CL99PM6	625	56.0	44.1	64.6	*	*	*	*	*	*	*	*
CL99PM7	719	59.0	49.2	71.9	33	*	55	*	117	*	*	*
					SODIUM CHLORIDE 35.0% 50°C							
CH01SH1	1	.7	.3	.4	91	*	101	*	118	*	88	101
CH07SH1	7	1.4	1.0	1.0	83	85	94	85	120	112	89	99
CH14SH1	14	1.2	1.9	1.9	*	*	*	*	*	*	87	108
CH99SH1	28	1.6	2.6	3.4	*	*	*	*	*	*	*	*
CH28SH1	28	2.4	2.0	2.1	106	100	117	107	111	117	89	108
CH56SH1	56	1.5	2.6	3.0	87	92	100	95	130	112	91	130
CH99SH2	131	1.7	2.2	3.0	*	*	*	*	*	*	*	*
CH99SH3	253	1.7	1.6	2.5	*	*	*	*	*	*	*	*
CH99SH4	379	1.3	1.9	3.8	*	*	*	*	*	*	*	*
CH99SH5	510	1.5	1.6	1.8	*	*	*	*	*	*	*	*
CH99SH6	630	1.1	1.9	2.6	*	*	*	*	*	*	*	*
CH99SH7	733	1.2	2.6	4.0	106	*	93	*	91	*	*	*
					SODIUM CHLORIDE 35.0% 23°C							
CL01SH1	1	.2	.3	.1	81	84	95	100	135	149	107	122
CL07SH1	7	.7	.3	.7	90	95	101	102	111	110	87	107
CL14SH1	14	4.9	*	.6	*	*	*	*	*	*	86	111
CL28SH1	28	.9	1.3	1.6	102	118	115	115	112	103	94	111
CL99SH1	28	.7	.6	1.4	*	*	*	*	*	*	*	*
CL56SH1	56	1.5	1.3	2.0	80	79	99	93	127	122	93	111
CL99SH2	131	1.3	.3	1.1	*	*	*	*	*	*	*	*
CL99SH3	246	1.2	.6	2.5	*	*	*	*	*	*	*	*
CL99SH4	379	1.5	1.3	3.0	*	*	*	*	*	*	*	*
CL99SH5	510	1.6	.6	1.8	*	*	*	*	*	*	*	*
CL99SH6	630	1.2	.3	1.4	*	*	*	*	*	*	*	*
CL99SH7	733	1.3	1.6	2.9	102	*	98	*	99	*	*	*
					SODIUM CHLORIDE 10.0% 50°C							
CH01SM1	1	1.6	2.3	2.0	97	97	105	93	103	97	102	105
CH07SM1	7	3.6	4.0	4.1	95	104	102	94	106	92	106	126
CH14SM1	14	2.6	3.6	3.8	91	103	107	97	112	93	106	101
CH99SM1	28	5.5	6.8	7.9	*	*	*	*	*	*	*	*
CH28SM1	28	3.8	5.6	5.7	77	92	101	96	129	118	104	108
CH56SM1	61	3.6	5.8	6.3	98	117	104	100	94	84	120	113
CH99SM2	132	5.1	5.5	6.2	*	*	*	*	*	*	*	*
CH99SM3	254	4.7	5.8	6.5	*	*	*	*	*	*	*	*
CH99SM4	370	7.4	5.5	6.5	*	*	*	*	*	*	*	*
CH99SM5	511	4.6	5.2	5.5	*	*	*	*	*	*	*	*
CH99SM6	624	4.0	5.8	6.2	*	*	*	*	*	*	*	*
CH99SM7	734	3.7	5.5	6.7	103	*	86	*	88	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
					SODIUM CHLORIDE 10.0% 23°C							
CL01SM1	1	.6	.3	.1	89	89	97	90	107	100	90	99
CL07SM1	7	1.3	1.3	1.8	100	110	103	104	95	97	115	119
CL14SM1	14	1.7	2.6	3.2	93	93	109	108	107	104	102	105
CL28SM1	28	2.8	3.9	4.7	96	93	110	109	111	124	97	104
CL99SM1	28	2.7	2.9	4.3	*	*	*	*	*	*	*	*
CL56SM1	61	3.0	3.9	4.6	93	99	105	99	104	96	108	110
CL99SM2	132	4.1	3.9	5.9	*	*	*	*	*	*	*	*
CL99SM3	246	3.8	4.2	7.2	*	*	*	*	*	*	*	*
CL99SM4	370	3.8	4.2	6.3	*	*	*	*	*	*	*	*
CL99SM5	511	3.4	3.2	5.1	*	*	*	*	*	*	*	*
CL99SM6	624	3.2	3.9	5.9	*	*	*	*	*	*	*	*
CL99SM7	734	3.0	3.9	6.0	103	*	91	*	86	*	*	*
					WATER 100.0% 50°C							
CH01WP1	1	1.8	2.3	2.2	89	97	103	106	108	110	96	99
CH07WP1	7	8.1	10.1	11.4	98	107	135	120	111	85	94	107
CH14WP1	14	14.6	21.5	27.2	107	111	118	97	79	69	96	99
CH99WP1	28	8.5	26.9	32.4	*	*	*	*	*	*	*	*
CH28WP1	28	18.1	20.8	25.4	85	92	117	77	93	58	93	101
CH56WP1	56	25.4	32.3	37.7	92	2	115	75	94	54	93	98
CH99WP2	132	34.6	59.7	73.8	*	*	*	*	*	*	*	*
CH99WP3	254	57.4	83.4	106.5	*	*	*	*	*	*	*	*
CH99WP4	370	76.2	102.9	131.3	*	*	*	*	*	*	*	*
CH99WP5	503	84.8	120.1	156.5	*	*	*	*	*	*	*	*
CH99WP6	622	89.2	124.7	159.5	*	*	*	*	*	*	*	*
CH99WP7	734	90.3	126.9	162.8	80	*	81	*	61	*	*	*
					WATER 100.0% 23°C							
CL01WP1	1	.9	.6	1.1	92	99	104	102	108	100	99	102
CL07WP1	7	2.4	2.0	3.4	97	103	113	111	116	109	94	100
CL14WP1	14	3.0	3.6	4.2	95	106	110	105	104	101	95	112
CL28WP1	28	5.3	4.8	6.5	94	101	112	101	111	94	97	105
CL99WP1	28	4.8	4.5	6.2	*	*	*	*	*	*	*	*
CL56WP1	56	6.6	7.4	8.6	94	103	114	104	119	93	91	96
CL99WP2	132	11.3	11.3	14.5	*	*	*	*	*	*	*	*
CL99WP3	246	13.3	13.9	21.6	*	*	*	*	*	*	*	*
CL99WP4	370	16.0	15.5	20.2	*	*	*	*	*	*	*	*
CL99WP5	503	17.4	17.2	21.7	*	*	*	*	*	*	*	*
CL99WP6	622	18.0	17.8	22.8	*	*	*	*	*	*	*	*
CL99WP7	734	18.9	19.7	25.0	101	*	111	*	92	*	*	*

CHLORINATED POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
					POTASSIUM DICHROMATE 10.0% 50°C							
CH01XM1	1	2.1	.6	.8	96	95	116	103	109	117	97	104
CH07XM1	7	5.4	3.2	4.6	80	92	100	89	135	96	87	119
CH14XM1	14	7.3	8.9	10.3	95	103	110	97	110	86	89	111
CH99XM1	28	9.6	12.7	13.7	*	*	*	*	*	*	*	*
CH28XM1	28	7.1	8.7	10.5	85	89	101	83	118	92	87	103
CH56XM1	56	11.8	14.4	47.0	93	111	113	98	102	93	93	89
CH99XM2	118	13.9	18.2	20.2	*	*	*	*	*	*	*	*
CH99XM3	231	15.4	18.9	23.7	*	*	*	*	*	*	*	*
CH99XM4	363	16.3	21.5	23.5	*	*	*	*	*	*	*	*
CH99XM5	489	16.0	20.8	22.7	*	*	*	*	*	*	*	*
CH99XM6	609	15.4	19.9	21.9	*	*	*	*	*	*	*	*
CH99XM7	711	17.1	22.8	25.2	103	*	99	*	85	*	*	*
					POTASSIUM DICHROMATE 10.0% 23°C							
CL01XM1	1	.7	1.0	1.3	96	109	117	106	134	89	96	120
CL07XM1	7	1.9	1.6	1.9	89	93	102	107	115	123	92	118
CL14XM1	14	2.4	1.9	2.9	93	108	113	103	112	90	105	107
CL28XM1	28	3.6	3.6	5.0	88	91	111	98	123	111	92	106
CL99XM1	28	3.6	3.8	4.3	*	*	*	*	*	*	*	*
CL56XM1	56	4.9	4.8	6.1	89	89	108	99	113	111	91	100
CL99XM2	118	6.9	7.3	9.0	*	*	*	*	*	*	*	*
CL99XM3	223	8.4	9.6	12.1	*	*	*	*	*	*	*	*
CL99XM4	363	10.3	10.5	13.0	*	*	*	*	*	*	*	*
CL99XM5	489	11.1	11.8	14.1	*	*	*	*	*	*	*	*
CL99XM6	609	10.6	11.2	13.8	*	*	*	*	*	*	*	*
CL99XM7	711	11.3	12.5	15.6	99	*	103	*	107	*	*	*

EPDM :   FINAL PROPERTIES

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
HYDROCHLORIC ACID 10.0% 50°C										
EH01AM1 1	2.12	37.50	3.01	1.00	65.04	69.20	496.40	450.08	7.90	8.42
EH07AM1 7	2.13	37.30	3.04	1.02	66.65	69.05	441.84	422.40	9.07	9.24
EH14AM1 14	2.27	39.40	3.05	1.02	68.30	64.36	419.28	401.92	7.90	8.26
EH28AM1 27	2.70	37.40	3.05	1.01	59.30	62.17	362.72	378.00	8.05	8.58
EH99AM1 28	2.75	46.10	3.08	1.04	*	*	*	*	*	*
EH56AM1 56	46.24	45.50	7.71	7.28	58.32	61.36	341.92	321.84	8.50	10.10
EH99AM2 144	3.65	50.90	3.39	1.14	*	*	*	*	*	*
EH99AM3 252	4.40	53.60	3.68	1.24	*	*	*	*	*	*
EH99AM4 368	4.75	55.00	3.72	1.26	*	*	*	*	*	*
EH99AM5 511	5.22	56.60	3.86	1.32	*	*	*	*	*	*
EH99AM6 621	5.36	57.10	3.91	1.34	*	*	*	*	*	*
EH99AM7 741	5.06	56.80	3.82	1.30	30.24	*	233.58	*	*	*
HYDROCHLORIC ACID 10.0% 23°C										
EL01AM2 1	2.28	40.20	3.00	1.00	54.48	57.84	452.24	426.00	8.82	7.90
EL01AM1 1	1.78	31.60	3.00	1.00	56.72	59.44	431.28	378.00	8.78	7.78
EL01AM3 1	1.80	32.70	3.00	1.00	70.00	54.96	434.32	438.64	8.42	7.90
EL07AM1 7	2.54	45.70	3.00	1.00	56.36	62.57	476.00	399.44	8.10	8.03
EL07AM3 7	1.96	34.40	3.00	1.00	51.92	70.30	449.04	430.16	8.59	9.89
EL07AM2 7	2.53	45.90	3.01	1.00	69.54	57.11	440.40	433.20	10.21	8.48
EL14AM3 14	1.80	31.60	3.01	1.01	59.21	74.70	409.04	434.16	9.11	10.43
EL14AM1 14	1.79	31.40	3.01	1.01	74.74	75.30	481.12	450.24	10.74	10.87
EL14AM2 14	1.78	31.20	3.01	1.01	63.26	64.71	416.40	427.68	9.65	9.39
EL28AM1 27	2.55	45.70	3.00	1.00	65.82	67.58	439.50	440.24	9.99	10.24
EL28AM2 27	2.56	45.40	3.00	1.00	71.00	71.48	430.64	450.40	10.10	10.17
EL28AM3 27	1.86	32.70	3.01	1.01	64.89	72.15	423.76	461.68	9.08	9.69
EL99AM1 28	2.51	44.10	3.01	1.00	*	*	*	*	*	*
EL56AM2 56	43.54	44.00	7.48	6.98	70.96	64.72	434.72	407.76	10.42	8.50
EL56AM1 56	39.09	42.60	7.43	6.97	58.00	61.04	432.00	393.84	9.50	9.30
EL56AM3 56	42.49	43.40	7.44	7.01	66.64	70.48	426.40	423.20	10.82	9.78
EL99AM2 144	2.54	44.30	3.01	1.01	*	*	*	*	*	*
EL99AM3 238	2.54	44.30	3.01	1.01	*	*	*	*	*	*
EL99AM4 368	2.56	44.50	3.02	1.01	*	*	*	*	*	*
EL99AM5 511	2.60	44.80	3.03	1.01	*	*	*	*	*	*
EL99AM6 621	2.60	44.70	3.04	1.01	*	*	*	*	*	*
EL99AM7 736	2.61	45.20	3.04	1.01	60.52	*	738.92	*	*	*
SODIUM HYDROXIDE 10.0% 50°C										
EH01BM1 1	2.56	44.40	3.00	1.00	71.18	67.75	433.52	445.60	8.78	8.52
EH07BM1 7	1.88	32.90	3.00	1.00	75.43	74.90	460.00	430.48	9.57	9.09
EH14BM1 14	2.27	39.80	3.00	1.00	59.86	64.63	420.96	425.76	8.77	9.89
EH28BM1 28	2.24	39.60	3.00	1.00	78.78	75.22	427.28	402.56	10.01	9.03

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM HYDROXIDE 10.0% 50°C										
EH99BM1 29	2.45	42.40	3.00	1.00	*	*	*	*	*	*
EH56BM1 56	2.33	40.60	3.00	1.00	71.85	75.13	444.48	431.36	7.94	9.02
EH99BM2 144	2.45	42.30	3.00	1.00	*	*	*	*	*	*
EH99BM3 252	2.45	42.40	3.00	1.00	*	*	*	*	*	*
EH99BM4 368	2.46	42.40	3.00	1.00	*	*	*	*	*	*
EH99BM5 510	2.46	42.40	3.00	0.99	*	*	*	*	*	*
EH99BM6 622	2.45	42.60	3.00	1.00	*	*	*	*	*	*
EH99BM7 741	2.50	43.10	3.00	1.00	69.82	*	771.50	*	*	*
SODIUM HYDROXIDE 10.0% 23°C										
EL01BM3 1	2.49	42.90	3.00	1.00	62.81	68.41	429.36	415.12	8.88	8.40
EL01BM1 1	2.51	43.50	3.00	1.00	77.50	71.00	430.88	427.52	9.44	8.24
EL01BM2 1	2.42	41.70	3.00	1.00	65.40	74.76	403.68	432.08	9.93	9.21
EL07BM3 7	2.59	45.30	3.00	1.00	68.05	71.90	456.72	459.84	9.04	8.89
EL07BM2 7	2.72	47.20	3.00	1.00	55.29	56.26	454.64	414.72	7.45	6.69
EL07BM1 7	2.15	37.20	2.99	1.00	76.86	79.88	448.96	432.08	9.64	9.98
EL14BM2 14	2.51	42.90	3.00	1.00	52.46	55.27	438.32	409.28	7.48	6.93
EL14BM1 14	2.28	39.90	3.00	1.00	59.93	63.13	441.84	431.80	7.02	8.70
EL14BM3 14	2.73	47.00	3.00	1.00	60.07	63.06	437.68	452.56	7.63	7.62
EL28BM2 28	1.98	34.50	3.00	1.00	65.40	68.98	480.88	413.20	8.49	8.26
EL99BM1 28	2.50	43.60	3.00	1.00	*	*	*	*	*	*
EL28BM1 28	2.25	39.40	3.00	1.00	60.65	75.30	440.80	388.96	6.84	8.60
EL28BM3 28	2.07	35.90	3.00	1.00	64.81	70.02	453.28	430.40	8.75	9.49
EL56BM3 56	1.99	34.90	3.00	1.00	64.86	67.58	496.40	448.80	8.39	7.71
EL56BM1 56	2.16	38.40	3.00	1.00	63.90	74.23	496.00	438.80	8.89	9.21
EL56BM2 56	2.54	44.00	3.00	1.00	54.38	62.02	473.28	*	8.15	8.13
EL99BM2 144	2.49	43.40	3.00	1.00	*	*	*	*	*	*
EL99BM3 238	2.47	43.40	3.00	1.01	*	*	*	*	*	*
EL99BM4 368	2.48	43.40	3.00	1.00	*	*	*	*	*	*
EL99BM5 510	2.49	43.40	3.00	1.00	*	*	*	*	*	*
EL99BM6 622	2.47	43.30	3.00	1.00	*	*	*	*	*	*
EL99BM7 736	2.48	43.50	3.00	1.00	62.73	*	776.25	*	*	*
1 2 DICHLOROETHANE .8% 50°C										
EH01DH1 1	2.42	40.00	3.06	1.02	48.22	50.76	409.16	390.90	7.13	6.79
EH07DH1 7	2.03	33.80	3.03	1.02	47.82	49.48	435.02	416.08	6.79	6.34
EH14DH1 14	2.44	40.60	3.05	1.02	51.28	52.94	471.86	466.12	7.39	6.32
EH99DH1 28	2.71	46.20	3.04	1.01	*	*	*	*	*	*
EH28DH1 28	2.36	38.60	3.07	1.02	55.76	54.66	426.06	410.30	6.82	6.95
EH56DH1 56	2.02	34.10	3.05	1.02	52.96	56.84	436.88	436.02	8.69	7.18
EH99DH2 133	2.70	45.90	3.04	1.01	*	*	*	*	*	*
EH99DH3 244	2.88	46.50	3.06	1.02	*	*	*	*	*	*
EH99DH4 364	2.83	46.70	3.10	1.03	*	*	*	*	*	*
EH99DH5 495	2.82	47.00	3.09	1.02	*	*	*	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .8% 50°C										
EH99DH6 629	2.87	47.30	3.09	1.03	*	*	*	*	*	*
EH99DH7 734	2.80	47.20	3.09	1.03	54.91	*	813.20	*	*	*
1 2 DICHLOROETHANE .8% 23°C										
EL01DH3 1	2.32	39.10	3.02	1.01	54.82	57.36	410.90	382.52	7.82	7.54
EL01DH2 1	2.02	34.30	3.01	1.01	57.62	57.04	455.10	398.46	7.48	7.67
EL01DH1 1	2.11	35.10	3.04	1.01	52.54	51.90	422.62	387.28	7.70	6.43
EL07DH1 7	2.31	39.00	3.04	1.01	52.00	52.14	458.32	414.36	7.39	6.85
EL07DH2 7	2.43	41.50	3.02	1.01	54.96	59.24	460.12	436.00	7.74	7.11
EL07DH3 7	2.30	39.80	3.02	1.01	59.34	*	490.68	*	9.30	8.23
EL14DH2 14	2.01	33.50	3.05	1.02	57.74	60.84	432.94	410.00	7.33	7.21
EL14DH1 14	2.05	34.00	3.05	1.02	60.54	61.50	*	*	8.29	7.71
EL14DH3 14	2.41	40.00	3.01	1.02	58.78	58.60	440.84	431.54	7.79	6.89
EL28DH1 28	2.53	42.10	3.07	1.02	46.62	47.86	426.32	396.14	5.89	5.81
EL28DH2 28	2.54	42.40	3.04	1.02	47.62	49.18	425.54	402.84	6.85	5.98
EL28DH3 28	2.24	37.70	3.04	1.02	51.30	56.00	411.08	386.36	8.62	5.99
EL99DH1 28	2.35	40.20	3.02	1.04	*	*	*	*	*	*
EL56DH1 56	1.94	33.20	3.02	1.02	51.36	58.70	392.46	412.36	8.59	7.51
EL56DH2 56	2.34	39.30	3.04	1.02	59.08	60.50	432.46	398.02	8.00	7.56
EL56DH3 56	2.00	33.50	3.04	1.02	56.24	56.48	427.94	402.26	7.03	8.03
EL99DH2 134	2.42	40.50	3.03	1.01	*	*	*	*	*	*
EL99DH3 231	2.38	40.90	3.07	1.02	*	*	*	*	*	*
EL99DH4 364	2.39	37.60	3.04	1.01	*	*	*	*	*	*
EL99DH5 495	2.38	40.40	3.04	1.01	*	*	*	*	*	*
EL99DH6 630	2.43	43.90	3.04	1.01	*	*	*	*	*	*
EL99DH7 729	2.44	41.10	3.06	1.02	64.87	*	737.58	*	*	*
1 2 DICHLOROETHANE .1% 50°C										
EH01DL1 1	2.27	39.50	3.01	1.00	49.06	50.98	417.56	393.94	6.98	6.84
EH07DL1 7	1.89	32.70	3.02	1.00	55.92	56.10	429.44	404.18	7.28	7.52
EH14DL1 14	2.25	38.60	3.02	1.00	57.82	58.44	*	*	7.62	8.06
EH28DL1 28	2.22	37.90	3.01	1.00	56.82	54.36	427.70	397.06	6.84	6.79
EH99DL1 28	2.58	45.20	3.01	1.01	*	*	*	*	*	*
EH56DL1 56	2.25	39.20	3.01	1.00	52.30	52.66	412.12	388.18	8.35	7.46
EH99DL2 139	2.61	44.80	3.02	1.01	*	*	*	*	*	*
EH99DL3 246	2.66	45.30	3.04	1.01	*	*	*	*	*	*
EH99DL4 366	2.66	45.10	3.04	1.02	*	*	*	*	*	*
EH99DL5 496	2.66	45.40	3.04	1.02	*	*	*	*	*	*
EH99DL6 631	2.67	45.70	3.04	1.01	*	*	*	*	*	*
EH99DL7 736	2.66	45.50	3.04	1.02	66.45	*	779.33	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .1% 23°C										
EL01DL3 1	1.93	33.80	3.01	1.00	54.04	56.96	423.16	401.48	8.06	7.04
EL01DL2 1	1.88	32.60	3.01	1.00	52.90	53.12	424.04	402.94	7.22	6.62
EL01DL1 1	2.23	38.60	3.00	1.00	55.66	56.76	407.70	400.54	8.17	7.41
EL07DL1 7	1.88	32.70	3.01	1.00	53.00	52.12	433.38	400.36	7.32	7.00
EL07DL2 7	2.30	39.60	2.99	1.00	56.36	59.62	428.40	407.28	8.15	7.58
EL07DL3 7	2.23	38.40	3.00	1.00	59.70	61.70	432.08	442.06	8.73	8.13
EL14DL1 14	2.27	39.20	3.00	1.00	55.88	56.20	*	*	8.04	7.13
EL14DL2 14	2.33	40.50	3.00	1.00	58.54	61.24	446.60	423.60	8.50	7.74
EL14DL3 14	2.33	40.20	3.00	1.00	59.06	56.58	483.06	415.12	7.69	8.91
EL28DL1 28	2.27	39.50	3.00	1.00	61.64	60.60	433.80	404.62	7.61	7.73
EL28DL3 28	2.18	37.60	3.00	1.00	47.96	49.00	411.68	393.70	6.84	6.56
EL99DL1 28	2.52	44.20	3.01	1.00	*	*	*	*	*	*
EL28DL2 28	2.26	39.00	3.00	1.00	53.12	53.64	407.82	402.86	7.47	7.04
EL56DL2 56	1.87	32.70	3.00	1.00	56.34	59.22	428.16	441.04	8.25	8.05
EL56DL3 56	1.89	32.80	3.01	1.00	59.26	60.16	426.70	397.12	8.26	7.54
EL56DL1 56	2.24	39.20	3.00	1.00	58.46	61.88	420.04	407.24	8.85	8.30
EL99DL2 136	2.54	44.30	3.01	1.00	*	*	*	*	*	*
EL99DL3 233	2.53	44.50	3.02	1.01	*	*	*	*	*	*
EL99DL4 366	2.53	44.40	3.01	1.01	*	*	*	*	*	*
EL99DL5 496	2.54	44.50	3.01	1.00	*	*	*	*	*	*
EL99DL6 632	2.56	44.40	3.02	1.00	*	*	*	*	*	*
EL99DL7 731	2.53	44.80	3.02	1.01	62.93	*	879.75	*	*	*
1 2 DICHLOROETHANE .5% 50°C										
EH01DM1 1	2.06	35.30	3.04	1.00	57.10	58.56	430.98	413.10	8.08	7.59
EH07DM1 7	2.24	38.30	3.03	1.00	57.70	60.98	441.04	430.02	8.58	7.22
EH14DM1 14	2.46	41.60	3.00	1.01	56.88	55.26	489.58	*	6.61	8.02
EH28DM1 28	2.51	41.80	3.05	1.01	48.48	49.90	440.08	421.06	7.03	5.85
EH99DM1 28	2.58	43.90	3.03	1.01	*	*	*	*	*	*
EH56DM1 56	2.39	40.70	3.02	1.01	56.34	55.08	433.54	397.38	7.91	7.78
EH99DM3 245	2.69	44.60	3.07	1.02	*	*	*	*	*	*
EH99DM4 365	2.65	44.70	3.07	1.02	*	*	*	*	*	*
EH99DM5 496	2.67	44.60	3.07	1.02	*	*	*	*	*	*
EH99DM6 630	2.70	45.10	3.08	1.02	*	*	*	*	*	*
EH99DM7 735	2.70	45.00	3.09	1.03	59.38	*	717.00	*	*	*
1 2 DICHLOROETHANE .5% 23°C										
EL01DM3 1	2.31	39.30	3.02	1.01	55.60	57.78	468.28	448.88	8.54	7.52
EL01DM2 1	1.93	32.90	3.02	1.01	52.20	53.32	445.04	410.00	7.77	7.01
EL01DM1 1	1.96	33.10	3.03	1.01	51.88	50.84	409.82	379.50	7.46	7.59
EL07DM2 7	2.27	38.60	3.01	1.01	53.82	56.08	413.42	409.86	7.77	7.50
EL07DM3 7	2.31	41.10	3.01	1.01	53.24	57.44	409.16	400.62	7.64	6.99
EL07DM1 7	2.29	38.90	3.03	1.01	56.30	55.36	412.92	391.94	7.99	7.94
EL14DM3 14	1.95	33.30	3.00	1.01	55.08	57.22	427.80	404.92	7.29	6.92

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .5% 23°C										
EL14DM2 14	2.33	39.60	3.02	1.01	57.00	61.72	426.74	407.28	8.03	7.06
EL14DM1 14	2.41	41.40	3.00	1.01	51.68	55.90	*	*	7.45	6.29
EL28DM1 28	2.41	41.70	3.03	1.01	48.32	50.62	419.00	432.48	7.16	6.04
EL99DM1 28	2.57	44.40	3.02	1.00	*	*	*	*	*	*
EL28DM2 28	2.43	41.70	3.01	1.01	58.58	59.86	420.44	396.86	8.54	8.37
EL28DM3 28	1.93	33.40	3.01	1.01	50.80	52.44	427.66	404.86	7.47	6.99
EL56DM3 56	2.26	39.50	3.01	1.01	57.92	59.10	415.34	396.68	7.79	7.23
EL56DM2 56	2.31	39.00	3.01	1.01	50.62	52.46	412.32	401.76	6.67	6.56
EL56DM1 56	1.95	33.50	3.01	1.01	50.34	51.72	398.08	388.12	7.00	6.74
EL99DM2 135	2.59	44.30	3.03	1.01	*	*	*	*	*	*
EL99DM3 233	2.57	44.40	3.02	1.01	*	*	*	*	*	*
EL99DM4 365	2.56	44.30	3.02	1.02	*	*	*	*	*	*
EL99DM5 496	2.57	44.50	3.02	1.00	*	*	*	*	*	*
EL99DM6 631	2.59	44.50	3.03	1.00	*	*	*	*	*	*
EL99DM7 730	2.64	44.60	3.04	1.01	63.27	*	880.92	*	*	*
FURFURAL 8.0% 50°C										
EH01FH1 1	2.42	41.70	3.01	1.00	63.30	63.76	443.00	398.40	12.68	12.04
EH07FH1 7	2.30	39.00	3.02	1.01	56.56	62.96	504.40	487.20	9.92	8.38
EH14FH1 14	2.25	38.50	3.03	1.01	55.12	56.56	463.20	460.80	7.54	8.52
EH28FH1 28	2.35	39.50	3.03	1.01	60.64	59.76	456.40	423.20	8.18	8.68
EH99FH1 28	2.11	35.10	3.03	1.01	*	*	*	*	*	*
EH56FH1 56	2.46	41.50	3.03	1.01	62.88	66.96	461.60	479.20	8.70	8.65
EH99FH2 117	2.38	38.60	3.17	1.05	*	*	*	*	*	*
EH99FH3 236	3.02	42.80	3.41	1.12	*	*	*	*	*	*
EH99FH4 350	3.35	45.20	3.57	1.18	*	*	*	*	*	*
EH99FH5 485	3.49	45.10	4.15	1.19	*	*	*	*	*	*
EH99FH6 616	3.79	47.00	3.72	1.22	*	*	*	*	*	*
EH99FH7 721	3.96	48.50	3.76	1.23	34.85	*	343.75	*	*	*
FURFURAL 8.0% 23°C										
EL01FH3 1	2.30	40.10	3.01	1.00	68.74	68.12	442.88	410.24	12.01	13.95
EL01FH2 1	2.23	39.40	3.00	1.00	69.02	72.20	455.68	432.08	12.57	13.88
EL01FH1 1	2.30	39.50	3.01	1.00	66.30	69.80	445.00	421.20	12.79	16.38
EL07FH2 7	2.27	38.80	3.01	1.01	64.30	66.34	482.80	423.20	10.46	10.11
EL07FH3 7	2.33	39.90	3.01	1.01	60.32	62.16	452.00	444.00	10.41	10.79
EL07FH1 7	2.23	38.20	3.02	1.01	58.76	62.20	463.20	455.20	9.74	10.06
EL14FH1 14	2.66	46.10	3.01	1.01	58.48	61.92	468.80	464.80	8.48	8.14
EL14FH3 14	2.33	39.90	3.01	1.01	51.92	57.60	439.20	440.80	8.10	6.78
EL14FH2 14	2.45	41.80	3.01	1.01	55.60	59.84	470.40	469.60	7.61	7.83
EL28FH1 28	2.65	45.20	3.01	1.01	54.44	58.12	480.00	446.40	8.14	7.42
EL28FH3 28	2.24	38.20	3.02	1.01	56.64	60.56	468.80	454.40	8.40	7.54
EL99FH1 28	2.12	36.70	3.01	1.01	*	*	*	*	*	*
EL28FH2 28	1.98	34.10	3.04	1.01	53.68	53.04	463.20	465.60	7.08	6.80

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 8.0% 23°C										
EL56FH1 56	2.56	43.40	3.02	1.00	61.36	64.88	472.80	448.80	9.15	7.98
EL56FH2 56	2.38	40.80	3.02	1.01	60.56	62.40	463.20	468.00	8.05	8.41
EL56FH3 56	2.35	40.10	3.02	1.01	63.04	62.88	498.40	444.00	9.67	8.77
EL99FH2 117	2.19	37.20	3.05	1.01	*	*	*	*	*	*
EL99FH3 219	2.36	39.00	3.15	1.04	*	*	*	*	*	*
EL99FH4 350	2.64	40.40	3.26	1.08	*	*	*	*	*	*
EL99FH5 485	2.55	40.30	3.21	1.06	*	*	*	*	*	*
EL99FH6 617	2.82	41.90	3.31	1.09	*	*	*	*	*	*
EL99FH7 716	2.96	42.80	3.37	1.10	43.42	*	538.17	*	*	*
FURFURAL 1.0% 50°C										
EH01FL1 1	2.31	39.70	3.01	1.00	67.13	68.30	451.44	416.90	13.13	10.36
EH07FL1 7	2.32	40.00	3.01	1.00	60.20	59.16	513.60	464.80	9.39	9.99
EH14FL1 14	2.34	40.60	3.01	1.00	59.12	57.92	466.40	450.40	8.09	9.58
EH28FL1 28	2.31	39.60	3.00	1.00	65.76	68.58	473.60	468.00	9.32	9.38
EH99FL1 28	2.11	36.80	3.01	1.00	*	*	*	*	*	*
EH56FL1 56	2.37	40.90	3.02	1.01	59.76	59.76	472.00	441.60	8.82	7.63
EH99FL2 123	2.15	36.70	3.03	1.01	*	*	*	*	*	*
EH99FL3 241	2.32	38.40	3.10	1.03	*	*	*	*	*	*
EH99FL4 355	2.32	38.50	3.11	1.03	*	*	*	*	*	*
EH99FL5 489	2.37	38.10	3.17	1.03	*	*	*	*	*	*
EH99FL6 621	2.42	39.10	3.14	1.04	*	*	*	*	*	*
EH99FL7 726	2.43	39.30	3.15	1.04	52.66	*	666.60	*	*	*
FURFURAL 1.0% 23°C										
EL01FL2 1	2.30	39.60	3.00	1.00	64.52	65.27	405.92	448.80	13.24	14.37
EL01FL3 1	2.26	40.00	3.00	1.00	69.51	68.22	396.08	432.25	11.68	14.81
EL01FL1 1	2.29	39.70	3.00	1.00	58.70	62.89	422.56	417.92	10.94	15.50
EL07FL2 7	2.46	42.40	3.00	1.00	67.48	68.96	482.00	470.40	10.88	10.24
EL07FL3 7	2.30	39.60	3.00	1.00	64.68	69.12	470.40	460.40	10.53	11.33
EL07FL1 7	2.27	39.50	3.00	1.00	52.96	56.08	512.00	440.80	9.24	8.06
EL14FL3 14	2.19	37.50	3.00	1.00	55.08	57.60	484.00	423.20	8.70	7.70
EL14FL2 14	2.20	37.80	3.00	1.00	58.72	58.40	480.00	458.40	8.16	8.64
EL14FL1 14	2.33	40.50	3.00	1.00	58.48	62.50	456.80	456.00	9.64	8.72
EL28FL2 28	2.20	37.70	3.00	1.00	62.56	62.96	450.40	428.00	7.93	8.44
EL28FL3 28	2.25	38.20	3.00	1.00	58.96	58.96	432.80	417.60	7.48	8.16
EL99FL1 28	2.52	44.30	3.00	1.00	*	*	*	*	*	*
EL28FL1 28	2.30	39.60	3.00	1.00	64.40	68.16	472.80	462.40	8.71	9.01
EL56FL3 56	2.33	39.90	3.00	1.00	57.12	62.48	408.00	434.40	9.05	8.38
EL56FL2 56	2.32	39.60	3.00	1.00	59.28	61.72	453.60	440.00	8.67	7.73
EL56FL1 56	2.33	39.80	3.00	1.00	67.84	70.04	485.30	446.40	10.03	9.12
EL99FL2 123	2.53	44.20	3.01	1.00	*	*	*	*	*	*
EL99FL3 224	2.55	44.60	3.02	1.01	*	*	*	*	*	*
EL99FL4 355	2.55	44.50	3.02	1.01	*	*	*	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 1.0% 23^oC										
EL99FL5 489	2.55	44.30	3.01	1.00	*	*	*	*	*	*
EL99FL6 622	2.58	44.60	3.02	1.01	*	*	*	*	*	*
EL99FL7 721	2.57	44.20	3.03	1.01	59.01	*	758.83	*	*	*
FURFURAL 4.0% 50^oC										
EH01FM1 1	2.37	40.20	3.02	1.00	63.51	62.78	458.80	418.00	11.57	14.64
EH07FM1 7	2.20	37.50	3.01	1.00	65.48	65.60	506.00	460.80	10.88	10.08
EH14FM1 14	2.25	38.40	3.01	1.01	55.19	56.54	471.20	455.20	8.92	8.82
EH28FM1 28	2.67	45.90	3.02	1.01	58.80	65.12	469.60	466.40	8.80	8.51
EH99FM1 29	2.18	38.00	3.02	1.01	*	*	*	*	*	*
EH56FM1 56	2.46	42.60	3.00	1.01	66.80	68.48	478.80	457.60	9.82	9.09
EH99FM2 124	2.20	38.40	3.05	1.01	*	*	*	*	*	*
EH99FM3 242	2.35	39.40	3.09	1.03	*	*	*	*	*	*
EH99FM4 356	2.40	39.80	3.11	1.03	*	*	*	*	*	*
EH99FM5 490	2.45	37.00	3.15	1.04	*	*	*	*	*	*
EH99FM6 622	2.54	41.00	3.16	1.05	*	*	*	*	*	*
EH99FM7 727	2.59	48.30	3.20	1.05	53.61	*	644.83	*	*	*
FURFURAL 4.0% 23^oC										
EL01FM1 1	2.21	37.90	3.00	1.00	58.86	59.90	443.20	407.04	10.63	12.75
EL01FM3 1	2.35	41.10	3.00	1.00	63.34	68.10	457.04	424.32	12.52	12.70
EL01FM2 1	2.29	40.00	3.00	1.01	62.81	64.74	448.80	412.96	11.59	12.09
EL07FM1 7	2.24	38.40	3.01	1.00	53.76	54.40	488.00	457.60	8.42	8.67
EL07FM2 7	2.27	38.70	3.00	1.01	65.12	66.76	471.20	454.40	10.36	10.79
EL07FM3 7	2.33	39.90	3.01	1.00	67.28	71.16	460.00	451.20	11.22	10.69
EL14FM1 14	2.63	46.10	3.01	1.00	57.64	56.92	482.40	452.00	8.72	9.78
EL14FM2 14	2.20	38.50	3.01	1.01	55.12	57.16	448.00	460.80	7.48	8.42
EL14FM3 14	2.61	45.70	3.01	1.01	60.80	60.36	442.40	425.30	9.42	8.68
EL28FM1 28	2.25	38.50	3.01	1.01	61.68	62.68	467.20	452.00	9.12	8.60
EL28FM3 28	2.27	38.50	3.00	1.00	56.40	56.00	478.40	453.60	7.58	7.26
EL28FM2 28	2.21	37.70	3.01	1.00	61.20	62.72	464.80	428.00	8.56	8.14
EL99FM1 29	2.55	44.00	3.00	1.00	*	*	*	*	*	*
EL56FM1 56	2.31	38.80	3.01	1.00	63.28	64.50	466.40	428.00	8.90	8.23
EL56FM2 56	2.36	40.40	3.00	1.00	65.12	65.76	485.60	449.60	9.09	8.88
EL56FM3 56	2.46	42.00	3.01	1.01	60.24	62.96	460.80	458.40	8.55	8.78
EL99FM2 124	2.57	44.10	3.02	1.00	*	*	*	*	*	*
EL99FM3 228	2.58	44.40	3.02	1.01	*	*	*	*	*	*
EL99FM4 356	2.61	44.40	3.04	1.01	*	*	*	*	*	*
EL99FM5 490	2.62	44.50	3.03	1.01	*	*	*	*	*	*
EL99FM6 623	2.65	45.00	3.04	1.01	*	*	*	*	*	*
EL99FM7 722	2.66	45.10	3.06	1.02	61.25	*	819.83	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 26.0% 50^oC										
EH01MH1 1	2.37	40.20	3.06	1.03	61.68	61.84	449.92	445.60	9.70	9.18
EH07MH1 7	2.65	44.40	3.09	1.03	58.32	62.16	424.40	406.16	10.90	10.50
EH14MH1 14	2.54	42.80	3.10	1.03	55.92	57.68	432.32	423.60	10.10	9.74
EH28MH1 28	2.56	43.90	3.09	1.03	63.83	67.03	432.72	431.20	9.87	9.68
EH99MH1 28	2.67	44.80	3.08	1.02	*	*	*	*	*	*
EH56MH1 57	2.39	39.70	3.12	1.03	63.99	65.30	436.40	416.64	9.97	8.76
EH99MH2 115	2.72	44.70	3.07	1.02	*	*	*	*	*	*
EH99MH3 240	2.72	45.30	3.08	1.02	*	*	*	*	*	*
EH99MH4 358	2.70	45.00	3.08	1.02	*	*	*	*	*	*
EH99MH5 494	2.64	44.40	3.04	1.01	*	*	*	*	*	*
EH99MH6 626	2.68	44.70	3.05	1.01	*	*	*	*	*	*
EH99MH7 730	2.76	45.50	3.08	1.02	44.95	*	772.20	*	*	*
METHYL ETHYL KETONE 26.0% 23^oC										
EL01MH1 1	2.86	48.70	3.07	1.02	57.68	60.88	435.12	418.32	8.58	8.82
EL01MH3 1	2.35	41.00	3.08	1.03	61.20	63.28	444.56	431.76	10.14	9.38
EL01MH2 1	2.38	40.80	3.06	1.02	64.08	64.00	442.80	404.53	10.45	9.42
EL07MH2 7	2.28	38.40	3.06	1.02	65.52	68.24	445.04	417.44	12.90	12.14
EL07MH1 7	2.50	41.80	3.06	1.02	57.84	58.80	444.80	413.28	11.90	10.98
EL07MH3 7	2.34	40.10	3.07	1.02	63.44	65.52	447.20	421.92	12.25	11.74
EL14MH2 14	2.65	44.50	3.07	1.02	61.20	62.80	436.88	409.52	11.50	10.42
EL14MH1 14	2.28	38.40	3.05	1.02	60.88	62.96	432.72	419.20	11.86	10.90
EL14MH3 14	2.56	43.10	3.06	1.02	64.72	66.32	456.00	408.24	12.42	11.14
EL28MH3 28	2.12	35.80	3.06	1.02	63.29	66.49	444.80	415.44	10.72	9.67
EL99MH1 28	2.35	39.60	3.07	1.02	*	*	*	*	*	*
EL28MH2 28	2.26	38.30	3.07	1.03	64.60	66.72	435.60	421.10	10.44	10.17
EL28MH1 28	2.39	39.90	3.07	1.02	58.39	59.62	442.24	414.72	9.51	9.08
EL56MH2 57	2.35	39.90	3.07	1.03	68.76	70.74	463.20	428.80	11.42	9.98
EL56MH1 57	2.39	40.80	3.08	1.03	65.72	66.97	464.32	435.36	10.87	10.05
EL56MH3 57	2.31	39.30	3.08	1.02	63.46	65.74	460.08	429.20	10.74	10.14
EL99MH2 121	2.38	39.30	3.07	1.02	*	*	*	*	*	*
EL99MH3 235	2.28	40.00	3.08	1.02	*	*	*	*	*	*
EL99MH4 358	2.36	46.40	3.06	1.02	*	*	*	*	*	*
EL99MH5 494	2.36	39.50	3.06	1.01	*	*	*	*	*	*
EL99MH6 627	2.39	39.00	3.01	1.00	*	*	*	*	*	*
EL99MH7 725	2.37	39.60	3.06	1.02	50.90	*	686.00	*	*	*
METHYL ETHYL KETONE 3.0% 50^oC										
EH01ML1 1	2.40	40.90	3.02	1.01	60.56	61.20	431.76	452.88	8.70	9.02
EH07ML1 7	2.32	39.50	3.02	1.00	65.52	65.04	431.76	431.44	13.06	11.70
EH14ML1 14	2.22	37.90	3.01	1.01	63.12	65.36	460.00	443.04	12.58	11.42
EH28ML1 28	2.41	41.00	3.03	1.00	64.66	68.06	448.88	445.12	10.66	10.31
EH99ML1 28	2.57	44.60	3.02	1.00	*	*	*	*	*	*
EH56ML1 57	2.17	37.50	3.00	1.00	65.90	69.03	457.92	432.08	11.99	10.89

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 3.0% 50°C										
EH99ML2 120	2.64	44.60	3.03	1.01	*	*	*	*	*	*
EH99ML3 240	2.66	45.00	3.05	1.01	*	*	*	*	*	*
EH99ML4 358	2.66	45.20	3.05	1.02	*	*	*	*	*	*
EH99ML5 494	2.67	45.00	3.04	1.02	*	*	*	*	*	*
EH99ML6 626	2.66	45.10	3.05	1.01	*	*	*	*	*	*
EH99ML7 730	2.65	45.20	3.04	1.01	62.56	*	756.83	*	*	*
METHYL ETHYL KETONE 3.0% 23°C										
EL01ML3 1	2.22	38.40	3.00	1.00	58.64	65.36	396.56	398.16	10.22	9.82
EL01ML2 1	2.12	37.10	3.00	1.00	69.04	67.92	447.44	405.76	9.74	10.86
EL01ML1 1	1.95	33.80	3.00	1.00	64.08	66.80	450.48	410.40	10.22	9.10
EL07ML3 7	2.19	38.10	3.00	1.00	66.64	66.48	450.56	414.80	13.70	10.90
EL07ML1 7	2.43	41.90	3.01	1.00	57.52	60.88	432.88	419.04	12.34	10.66
EL07ML2 7	2.27	39.20	3.01	1.00	66.48	65.84	453.84	423.28	13.50	12.18
EL14ML1 14	2.73	47.10	3.01	1.00	57.36	58.96	448.32	430.00	11.70	11.50
EL14ML2 14	2.30	39.60	3.01	1.00	66.80	67.60	438.72	422.32	13.22	12.06
EL14ML3 14	2.29	39.80	3.01	1.00	61.84	61.52	445.84	434.56	12.26	10.90
EL28ML3 28	2.58	44.30	3.00	1.00	61.86	66.57	443.84	424.80	10.97	9.87
EL28ML2 28	2.22	38.30	3.00	1.00	65.82	67.06	435.12	415.12	11.31	9.91
EL28ML1 28	2.48	42.80	3.01	1.00	61.75	67.67	421.20	420.56	11.49	9.92
EL99ML1 28	2.46	42.80	3.01	1.00	*	*	*	*	*	*
EL56ML1 57	2.26	39.50	3.01	1.00	63.50	62.18	440.24	419.60	10.95	9.94
EL56ML2 57	2.26	39.00	3.00	1.00	64.12	66.41	445.04	419.76	11.10	10.56
EL56ML3 57	2.33	38.70	3.01	1.00	68.30	68.49	437.36	413.60	12.03	11.13
EL99ML2 120	2.50	42.80	3.02	1.00	*	*	*	*	*	*
EL99ML3 235	2.48	43.20	3.02	1.01	*	*	*	*	*	*
EL99ML4 358	2.49	42.90	3.02	1.01	*	*	*	*	*	*
EL99ML5 494	2.48	42.90	3.01	1.00	*	*	*	*	*	*
EL99ML6 627	2.50	43.00	3.02	1.00	*	*	*	*	*	*
EL99ML7 725	2.49	43.20	3.03	1.01	59.99	*	835.58	*	*	*
METHYL ETHYL KETONE 13.0% 50°C										
EH01MM1 1	2.32	39.70	3.05	1.02	59.44	59.44	431.12	401.04	9.14	9.02
EH07MM1 7	2.65	45.20	3.06	1.02	57.04	60.56	438.72	434.64	11.38	10.62
EH14MM1 14	2.46	41.70	3.05	1.01	66.16	67.28	451.20	409.76	12.34	10.62
EH99MM1 28	2.60	44.90	3.03	1.01	*	*	*	*	*	*
EH28MM1 28	2.46	41.50	3.09	1.02	65.50	66.74	440.72	417.04	10.69	9.42
EH56MM1 57	2.38	41.50	3.05	1.02	60.76	66.97	439.84	434.72	11.77	10.26
EH99MM2 120	2.70	45.10	3.05	1.02	*	*	*	*	*	*
EH99MM3 239	2.75	45.80	3.07	1.03	*	*	*	*	*	*
EH99MM4 357	2.74	45.50	3.07	1.03	*	*	*	*	*	*
EH99MM5 493	2.72	45.20	3.06	1.02	*	*	*	*	*	*
EH99MM6 625	2.72	45.40	3.05	1.02	*	*	*	*	*	*
EH99MM7 729	2.76	45.80	3.07	1.03	55.82	*	783.58	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 13.0% 23°C										
EL01MM2 1	2.20	37.80	3.03	1.01	63.76	62.00	440.32	390.72	10.14	9.14
EL01MM3 1	2.18	37.20	3.03	*	60.08	58.64	435.68	400.40	*	9.02
EL01MM1 1	2.13	36.70	3.04	1.01	64.24	65.68	433.52	423.04	9.58	9.66
EL07MM2 7	2.34	40.00	3.03	1.01	60.24	59.76	438.48	406.56	12.10	11.58
EL07MM3 7	2.31	39.50	3.03	1.01	*	*	*	*	13.66	12.46
EL07MM1 7	2.61	45.00	3.04	1.01	66.64	69.36	431.68	427.84	14.02	12.10
EL14MM1 14	2.29	39.10	3.02	1.01	60.88	61.84	434.48	403.36	12.62	11.70
EL14MM2 14	2.32	39.50	3.02	1.01	56.72	57.36	451.84	418.00	12.26	10.50
EL14MM3 14	2.49	43.10	3.03	1.01	60.08	60.08	441.92	403.36	11.90	11.18
EL28MM2 28	2.17	37.30	3.03	1.01	57.58	62.82	450.88	421.84	9.96	9.13
EL28MM3 28	2.35	40.50	3.04	1.01	65.35	66.55	442.56	408.56	10.91	10.03
EL28MM1 28	2.29	39.40	3.04	1.01	61.46	63.37	459.92	433.36	10.16	9.20
EL99MM1 28	2.17	37.10	3.03	1.01	*	*	*	*	*	*
EL56MM2 57	2.52	43.10	3.03	1.01	64.54	65.18	426.88	395.36	11.67	9.78
EL56MM3 57	2.62	44.90	3.02	1.00	68.87	68.70	453.92	434.64	12.81	11.40
EL56MM1 57	2.27	39.40	3.02	1.01	68.23	71.56	432.00	432.48	12.43	10.77
EL99MM2 120	2.20	37.40	3.03	1.01	*	*	*	*	*	*
EL99MM3 234	2.18	37.80	3.05	1.02	*	*	*	*	*	*
EL99MM4 357	2.22	37.60	3.04	1.01	*	*	*	*	*	*
EL99MM5 493	2.23	37.60	3.05	1.01	*	*	*	*	*	*
EL99MM6 626	2.22	37.20	3.02	1.01	*	*	*	*	*	*
EL99MM7 724	2.23	38.00	3.05	1.01	47.10	*	648.58	*	*	*
ASTM #2 OIL SATURATED 50°C										
EH01OM1 1	2.06	33.60	3.06	1.01	57.40	59.45	437.76	417.92	7.60	8.55
EH07OM1 7	2.07	36.10	3.01	1.00	64.33	66.68	435.44	415.76	10.09	10.85
EH14OM1 14	2.44	41.40	3.02	1.00	59.05	61.96	422.64	421.04	7.94	8.54
EH99OM1 28	2.90	48.50	3.18	1.04	*	*	*	*	*	*
EH28OM1 28	2.06	35.40	3.02	1.00	61.20	59.60	452.00	424.00	7.50	7.70
EH56OM1 56	2.61	43.50	3.04	1.00	60.68	62.09	467.92	425.52	8.98	8.41
EH99OM2 128	3.04	*	3.20	1.07	*	*	*	*	*	*
EH99OM3 251	3.30	52.40	3.27	1.13	*	*	*	*	*	*
EH99OM4 364	3.33	49.90	3.30	1.10	*	*	*	*	*	*
EH99OM5 503	3.40	49.90	3.33	1.13	*	*	*	*	*	*
EH99OM6 626	3.56	53.40	3.40	1.14	*	*	*	*	*	*
EH99OM7 736	3.70	52.40	3.44	1.13	60.74	*	824.42	*	*	*
ASTM #2 OIL SATURATED 23°C										
EL01OM3 1	1.93	33.50	3.00	1.00	61.70	65.14	425.52	397.76	8.85	8.30
EL01OM1 1	2.09	34.70	3.10	1.04	65.02	67.22	423.68	424.32	9.06	9.25
EL01OM2 1	1.94	33.50	3.00	1.00	65.22	66.06	452.32	416.32	8.75	8.81
EL07OM1 7	2.74	47.40	3.00	1.00	63.64	62.84	486.00	414.40	9.10	9.04
EL07OM2 7	2.62	45.20	3.00	1.00	62.33	62.97	439.52	402.56	10.01	9.09
EL07OM3 7	2.41	41.10	3.01	1.00	66.09	67.22	454.80	430.80	10.14	9.53

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				ASTM #2 OIL	SATURATED 23°C					
EL140M2 14	2.73	47.50	3.00	1.00	64.23	66.30	440.20	426.88	8.80	8.71
EL140M1 14	2.56	44.30	3.01	1.00	63.27	64.74	446.08	422.72	8.41	8.98
EL140M3 14	2.48	42.00	3.01	1.01	52.58	56.84	413.28	418.32	7.39	7.62
EL280M1 28	2.25	38.40	3.01	1.00	53.20	56.00	412.00	404.00	7.30	7.30
EL280M2 28	2.28	39.00	3.00	1.00	65.62	67.62	431.84	414.56	9.55	9.00
EL280M3 28	2.74	47.00	3.00	1.00	58.81	58.90	433.84	396.32	8.03	7.74
EL990M1 28	2.70	45.50	3.05	1.01	*	*	*	*	*	*
EL560M2 56	2.18	37.60	3.01	1.00	49.68	54.80	424.72	428.72	8.10	6.62
EL560M1 56	2.64	46.00	3.01	1.00	66.55	76.39	427.92	437.52	10.09	8.70
EL560M3 56	2.62	45.40	3.01	1.00	59.76	67.28	429.12	427.04	9.42	8.14
EL990M2 128	2.74	46.60	3.07	1.04	*	*	*	*	*	*
EL990M3 237	2.74	45.70	3.06	1.03	*	*	*	*	*	*
EL990M4 364	2.78	45.70	3.09	1.04	*	*	*	*	*	*
EL990M5 503	3.06	47.60	3.17	1.05	*	*	*	*	*	*
EL990M6 626	3.13	47.90	2.70	1.08	*	*	*	*	*	*
EL990M7 731	3.20	48.10	3.28	1.08	57.83	*	755.42	*	*	*
				ASTM #2 OIL	100.0% 50°C					
EH010P1 1	3.52	51.90	3.30	1.11	46.33	44.07	345.92	351.20	5.83	7.20
EH070P1 7	4.61	57.40	3.66	1.25	38.80	37.20	280.00	272.00	4.14	3.58
EH140P1 14	4.93	61.10	3.66	1.25	38.80	39.20	276.00	248.00	4.72	4.28
EH280P1 28	4.31	52.40	3.68	1.24	42.86	42.66	279.12	277.12	6.22	6.10
EH990P1 28	4.11	54.30	3.69	1.19	*	*	*	*	*	*
EH560P1 56	4.39	52.70	3.70	1.25	42.00	41.04	278.00	266.08	5.98	5.94
EH990P2 141	4.48	55.50	3.79	1.23	*	*	*	*	*	*
EH990P3 257	4.67	55.90	3.81	1.23	*	*	*	*	*	*
EH990P4 385	4.61	55.50	3.81	1.24	*	*	*	*	*	*
EH990P5 509	4.68	56.00	3.82	1.24	*	*	*	*	*	*
EH990P6 627	4.71	55.90	3.84	1.25	*	*	*	*	*	*
EH990P7 742	4.74	56.30	3.84	1.25	42.99	*	564.58	*	*	*
				ASTM #2 OIL	100.0% 23°C					
EL010P1 1	2.60	42.60	3.07	1.02	66.04	68.38	429.20	418.56	11.01	10.43
EL010P3 1	2.20	35.50	3.13	1.04	60.74	61.19	434.00	404.08	8.42	8.88
EL010P2 1	2.42	39.40	3.09	1.04	60.92	59.53	421.20	370.56	8.63	8.93
EL070P2 7	3.59	52.60	3.30	1.10	57.18	56.26	406.40	372.00	8.31	6.46
EL070P3 7	3.69	54.30	3.30	1.13	54.73	55.13	379.28	376.40	7.12	6.41
EL070P1 7	2.99	42.50	3.36	1.14	43.20	43.20	356.00	336.00	5.10	4.44
EL140P2 14	3.41	45.70	3.49	1.29	36.74	35.77	312.64	294.72	5.40	6.30
EL140P3 14	4.00	55.80	3.40	1.16	47.98	48.60	349.84	334.10	6.85	6.75
EL140P1 14	4.00	56.50	3.41	1.16	54.80	52.40	360.00	340.00	5.56	6.02
EL280P1 28	4.44	58.10	3.52	1.19	40.90	43.08	280.96	279.28	6.33	6.99
EL280P3 28	4.38	57.30	3.53	1.20	35.96	36.14	285.93	274.80	6.63	5.43
EL280P2 28	3.39	43.00	3.60	1.23	33.72	33.78	286.40	270.32	5.74	6.04

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				ASTM #2 OIL 100.0% 23°C							
EL99OP1	28	4.17	54.30	3.69	1.18	*	*	*	*	*	*
EL56OP2	55	4.51	57.50	3.63	1.23	44.08	43.60	277.12	276.16	4.94	6.62
EL56OP3	55	4.77	60.50	3.60	1.23	43.12	40.56	273.60	245.28	5.02	5.98
EL56OP1	56	4.28	53.30	3.64	1.24	36.80	39.12	269.04	277.52	6.26	5.50
EL99OP2	141	4.70	56.20	3.81	1.23	*	*	*	*	*	*
EL99OP3	244	4.63	56.30	3.82	1.24	*	*	*	*	*	*
EL99OP4	385	4.65	56.10	3.81	1.23	*	*	*	*	*	*
EL99OP5	509	4.66	56.30	3.80	1.22	*	*	*	*	*	*
EL99OP6	627	4.64	56.00	3.82	1.24	*	*	*	*	*	*
EL99OP7	737	4.63	56.20	3.83	1.24	48.02	*	556.92	*	*	*
				PHENOL 8.0% 50°C							
EH01PH1	1	2.44	41.80	3.02	1.00	55.78	57.20	449.64	435.28	7.32	7.50
EH07PH1	7	2.60	44.50	3.00	1.00	62.28	63.50	418.84	411.42	8.79	8.79
EH14PH1	14	2.48	42.30	3.04	1.02	61.22	60.22	508.88	517.80	8.91	8.53
EH28PH1	28	2.42	41.60	3.01	1.01	60.06	64.64	472.54	465.66	9.24	7.96
EH99PH1	29	2.54	43.30	3.02	1.01	*	*	*	*	*	*
EH56PH1	56	2.69	45.50	3.03	1.01	60.60	62.50	469.80	458.10	7.78	7.92
EH99PH2	121	2.61	43.50	3.06	1.01	*	*	*	*	*	*
EH99PH3	243	2.68	44.20	3.09	1.03	*	*	*	*	*	*
EH99PH4	362	2.71	44.50	3.11	1.03	*	*	*	*	*	*
EH99PH5	499	2.77	45.10	3.13	1.03	*	*	*	*	*	*
EH99PH6	624	2.80	45.10	3.14	1.04	*	*	*	*	*	*
EH99PH7	728	2.83	45.40	3.15	1.04	52.47	*	808.00	*	*	*
				PHENOL 8.0% 23°C							
EL01PH1	1	2.33	39.20	3.00	*	47.32	48.34	449.34	414.74	6.71	6.57
EL01PH2	1	1.96	33.70	3.00	1.00	45.08	45.78	461.48	416.74	6.34	6.01
EL01PH3	1	1.81	31.70	3.01	1.00	63.40	66.84	445.44	422.58	9.14	8.17
EL07PH1	7	2.61	45.00	3.00	1.01	54.30	56.62	427.86	414.00	8.09	7.36
EL07PH2	7	2.39	41.40	3.01	1.00	50.18	49.18	454.12	410.46	7.39	6.23
EL07PH3	7	2.38	41.30	3.02	1.01	64.03	66.76	450.27	430.16	9.74	8.95
EL14PH2	14	2.46	42.20	3.03	1.01	63.34	65.56	438.36	420.92	9.07	8.30
EL14PH1	14	2.60	45.20	3.01	1.00	51.68	52.68	467.78	443.16	7.85	7.06
EL14PH3	14	2.44	42.10	3.01	1.01	65.44	67.82	443.78	428.50	9.37	8.79
EL28PH2	28	1.93	33.00	3.02	1.00	54.02	53.68	458.42	427.04	6.98	6.83
EL28PH3	28	1.91	32.90	3.02	1.01	48.88	50.82	457.58	422.74	7.48	6.24
EL28PH1	28	2.41	41.00	3.01	1.00	58.12	58.80	447.80	437.36	6.80	8.69
EL99PH1	29	2.34	40.80	3.01	1.01	*	*	*	*	*	*
EL56PH1	56	2.43	41.20	3.02	1.01	62.26	61.62	484.00	429.64	8.92	8.09
EL56PH2	56	2.27	38.90	3.02	1.01	61.08	66.92	455.88	442.44	8.92	8.15
EL56PH3	56	2.26	38.70	3.01	1.01	56.26	61.24	476.94	439.24	8.33	7.85
EL99PH2	121	2.37	40.80	3.03	1.01	*	*	*	*	*	*
EL99PH3	230	2.40	41.10	3.04	1.01	*	*	*	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 8.0% 23°C										
EL99PH4 362	2.42	41.20	3.05	1.02	*	*	*	*	*	*
EL99PH5 499	2.45	41.30	3.06	1.01	*	*	*	*	*	*
EL99PH6 625	2.48	41.50	3.07	1.02	*	*	*	*	*	*
EL99PH7 723	2.50	41.90	3.09	1.02	52.73	*	710.50	*	*	*
PHENOL 1.0% 50°C										
EH01PL1 1	2.41	41.50	3.00	1.00	59.60	61.72	469.94	464.72	9.47	8.33
EH07PL1 7	2.36	40.90	3.00	1.00	58.14	56.18	466.78	423.04	8.14	8.42
EH14PL1 14	2.63	45.60	3.01	1.00	50.92	52.52	434.12	408.88	7.45	7.50
EH99PL1 28	2.54	44.50	3.00	1.00	*	*	*	*	*	*
EH28PL1 28	2.36	40.40	3.00	1.00	60.20	61.74	476.44	477.30	9.68	8.92
EH56PL1 56	2.59	44.60	3.00	1.00	59.62	62.38	492.24	458.00	8.76	7.91
EH99PL2 122	2.57	44.50	3.02	1.01	*	*	*	*	*	*
EH99PL3 245	2.61	44.80	3.04	1.01	*	*	*	*	*	*
EH99PL4 363	2.62	44.80	3.05	1.01	*	*	*	*	*	*
EH99PL5 499	2.62	44.60	3.04	1.01	*	*	*	*	*	*
EH99PL6 625	2.65	45.10	3.03	1.02	*	*	*	*	*	*
EH99PL7 729	2.63	45.40	3.05	1.01	59.42	*	741.25	*	*	*
PHENOL 1.0% 23°C										
EL01PL2 1	2.46	41.90	3.00	1.00	54.32	59.98	447.24	402.64	9.16	6.19
EL01PL3 1	2.50	43.70	3.00	1.00	63.24	64.66	435.04	411.72	9.04	7.95
EL01PL1 1	2.38	40.90	3.00	1.00	60.64	64.78	422.20	412.24	9.34	8.89
EL07PL2 7	2.54	44.20	3.00	1.00	65.20	68.12	419.26	413.96	9.60	9.07
EL07PL1 7	2.59	45.20	2.99	1.00	57.98	60.36	454.04	444.90	9.42	7.51
EL07PL3 7	2.40	41.90	3.00	1.00	63.92	64.40	432.22	426.30	9.74	8.84
EL14PL2 14	2.36	41.20	3.00	1.00	64.18	65.66	470.50	429.00	8.97	8.99
EL14PL3 14	2.34	40.80	3.00	1.00	62.54	64.96	459.66	432.82	9.24	8.76
EL14PL1 14	2.41	41.50	3.01	1.00	57.94	54.46	446.26	415.62	7.30	9.04
EL28PL1 28	2.38	41.10	3.00	1.00	58.18	62.70	469.06	461.56	9.55	8.72
EL28PL3 28	1.83	31.90	3.01	1.33	59.92	62.30	446.70	420.20	8.67	8.28
EL28PL2 28	2.48	43.10	3.00	1.00	65.90	67.10	446.76	432.02	9.45	8.85
EL99PL1 28	2.54	43.30	3.01	1.00	*	*	*	*	*	*
EL56PL3 56	2.42	41.70	3.01	1.00	62.14	65.02	437.72	424.72	8.86	8.79
EL56PL1 56	2.37	41.30	3.00	1.00	53.70	57.36	456.70	428.06	8.39	7.38
EL56PL2 56	2.40	41.60	3.02	1.00	64.46	62.78	469.10	451.12	8.44	8.30
EL99PL2 122	2.58	44.20	3.03	1.01	*	*	*	*	*	*
EL99PL3 233	2.57	44.50	3.03	1.01	*	*	*	*	*	*
EL99PL4 363	2.59	44.30	3.03	1.01	*	*	*	*	*	*
EL99PL5 499	2.58	44.30	3.03	1.01	*	*	*	*	*	*
EL99PL6 626	2.60	44.30	3.03	1.01	*	*	*	*	*	*
EL99PL7 724	2.59	44.60	3.04	1.01	61.56	*	848.08	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
			PHENOL 4.0% 50°C							
EH01PM1 1	2.41	41.60	3.00	1.00	48.36	51.14	509.42	483.84	7.84	6.99
EH07PM1 7	2.64	45.60	3.00	1.01	48.86	50.06	421.18	409.74	7.61	7.17
EH14PM1 14	2.42	41.40	3.03	1.01	52.16	56.82	439.54	426.58	8.97	7.76
EH28PM1 28	2.39	41.30	3.01	1.01	45.32	48.44	445.36	434.62	6.90	5.81
EH99PM1 29	2.62	45.30	3.02	1.00	*	*	*	*	*	*
EH56PM1 56	2.61	44.60	3.00	1.01	50.24	56.52	474.74	471.82	7.09	5.96
EH99PM2 121	2.67	45.60	3.04	1.01	*	*	*	*	*	*
EH99PM3 244	2.73	46.60	3.07	1.02	*	*	*	*	*	*
EH99PM4 362	2.75	46.50	3.08	1.03	*	*	*	*	*	*
EH99PM5 499	2.81	46.80	3.09	1.03	*	*	*	*	*	*
EH99PM6 624	2.82	46.90	3.09	1.03	*	*	*	*	*	*
EH99PM7 728	2.83	47.00	3.10	1.03	57.34	*	742.60	*	*	*
			PHENOL 4.0% 23°C							
EL01PM2 1	1.87	32.80	3.00	1.00	47.04	48.42	449.24	412.98	6.48	6.45
EL01PM1 1	2.41	42.40	3.00	1.00	51.42	52.36	490.88	472.44	7.74	8.20
EL01PM3 1	1.99	34.30	3.01	1.00	55.42	58.44	447.66	408.06	8.68	7.31
EL07PM2 7	2.38	41.50	3.01	1.00	63.20	63.12	447.28	420.66	9.07	8.02
EL07PM1 7	2.41	41.70	3.00	1.00	55.16	57.14	471.82	442.88	9.30	6.90
EL07PM3 7	2.36	41.20	3.01	1.00	52.40	53.82	438.60	405.58	8.37	7.29
EL14PM3 14	2.42	41.80	3.00	1.00	61.74	62.70	468.22	429.98	8.71	8.69
EL14PM2 14	2.22	38.70	3.00	1.00	61.46	65.38	437.80	441.82	9.20	8.26
EL14PM1 14	2.43	42.00	3.02	1.01	61.70	62.34	453.24	450.30	9.46	8.29
EL28PM1 28	2.40	41.50	3.00	1.00	54.92	56.64	448.50	435.26	9.10	7.10
EL28PM3 28	2.40	41.10	3.02	1.00	59.04	64.38	451.30	432.48	8.64	7.60
EL28PM2 28	2.49	42.90	3.01	1.00	67.84	66.84	436.22	458.88	10.02	8.38
EL99PM1 29	2.55	44.70	3.01	1.00	*	*	*	*	*	*
EL56PM2 56	2.27	39.40	3.01	1.01	68.16	66.68	465.52	427.08	9.02	8.40
EL56PM3 56	2.37	40.40	3.00	1.01	63.30	62.88	451.78	425.64	8.86	8.42
EL56PM1 56	2.58	44.60	3.01	1.00	46.78	50.16	439.28	425.56	6.63	5.94
EL99PM2 121	2.57	44.30	3.02	1.01	*	*	*	*	*	*
EL99PM3 231	2.57	44.90	3.02	1.01	*	*	*	*	*	*
EL99PM4 362	2.59	45.60	3.03	1.01	*	*	*	*	*	*
EL99PM5 499	2.61	44.60	3.04	1.01	*	*	*	*	*	*
EL99PM6 625	2.62	44.80	3.04	1.01	*	*	*	*	*	*
EL99PM7 723	2.62	44.50	3.05	1.01	53.48	*	678.17	*	*	*
			SODIUM CHLORIDE 35.0% 50°C							
EH01SH1 1	1.90	33.10	3.01	1.00	55.85	55.29	443.92	431.76	6.59	6.94
EH07SH1 7	2.68	37.10	3.00	1.00	72.44	75.85	438.24	434.40	9.51	9.39
EH14SH1 14	2.23	39.10	3.00	1.00	53.29	56.73	413.60	383.76	8.91	8.10
EH28SH1 28	2.23	39.20	3.01	1.00	62.70	75.53	389.12	452.50	8.12	8.71
EH56SH1 56	2.05	36.50	3.00	1.00	71.38	66.73	468.56	438.96	9.05	9.37
EH99SH2 131	2.50	44.10	2.99	0.99	*	*	*	*	*	*
EH99SH3 253	2.51	44.00	2.99	0.99	*	*	*	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
EH99SH4 379	2.52	43.90	2.99	1.00	*	*	*	*	*	*
EH99SH5 510	2.56	44.40	2.99	0.99	*	*	*	*	*	*
EH99SH1 630	2.53	44.30	2.99	1.00	*	*	*	*	*	*
EH99SH6 630	2.49	44.10	2.99	1.00	*	*	*	*	*	*
EH99SH7 742	2.48	44.00	2.99	0.99	67.31	*	797.25	*	*	*
SODIUM CHLORIDE 35.0% 23°C										
EL01SH1 1	2.74	47.50	3.00	1.00	61.51	64.23	430.16	401.76	8.46	8.80
EL01SH2 1	2.70	47.00	3.00	1.00	72.40	74.40	428.00	408.00	9.60	9.36
EL01SH3 1	2.44	42.30	3.01	1.00	71.60	72.00	452.00	416.00	8.92	9.76
EL07SH2 7	2.47	42.80	3.00	1.00	62.86	65.53	459.60	450.16	9.07	7.80
EL07SH1 7	*	46.70	3.00	1.00	66.38	71.50	431.04	421.92	9.09	8.93
EL07SH3 7	2.19	37.60	3.00	1.00	55.06	58.66	447.92	422.00	7.13	7.60
EL14SH3 14	2.56	44.40	3.01	1.00	67.64	66.82	461.60	398.80	8.50	8.82
EL14SH1 14	2.21	38.90	3.00	1.00	61.64	55.32	436.24	388.88	7.49	8.54
EL14SH2 14	2.70	47.00	3.00	1.00	73.61	74.66	463.92	452.08	8.73	9.25
EL28SH2 28	2.15	37.10	3.00	1.00	70.17	67.54	422.08	441.36	8.67	7.69
EL28SH3 28	2.58	44.80	3.00	1.00	68.63	70.31	462.80	446.08	8.69	8.52
EL99SH1 28	2.50	44.20	3.00	1.00	*	*	*	*	*	*
EL28SH1 28	2.25	39.40	3.00	1.00	70.18	71.21	408.72	454.08	8.11	9.61
EL56SH1 56	2.49	44.20	3.00	1.00	75.43	64.57	489.84	371.36	9.44	8.68
EL56SH3 56	2.51	43.30	3.01	1.00	67.20	67.60	396.00	428.00	8.36	7.98
EL56SH2 56	2.38	40.90	3.01	1.00	61.20	60.00	412.00	412.00	6.84	7.50
EL99SH2 131	2.51	44.00	3.00	1.00	*	*	*	*	*	*
EL99SH3 246	2.51	43.90	3.00	1.01	*	*	*	*	*	*
EL99SH4 379	2.50	43.80	3.00	1.00	*	*	*	*	*	*
EL99SH5 510	2.50	43.60	3.00	1.00	*	*	*	*	*	*
EL99SH6 630	2.49	43.80	3.00	1.00	*	*	*	*	*	*
EL99SH7 737	2.48	43.70	3.00	1.00	63.02	*	841.83	*	*	*
SODIUM CHLORIDE 10.0% 50°C										
EH01SM1 1	2.21	39.30	3.01	1.00	57.52	53.84	392.80	398.88	6.70	7.90
EH07SM1 7	2.22	39.10	2.99	1.00	57.53	54.63	458.64	480.00	7.59	7.21
EH14SM1 14	38.10	39.50	7.30	6.92	62.64	62.64	432.70	420.16	7.17	7.22
EH28SM1 28	37.17	38.50	7.38	6.90	60.24	53.52	448.88	412.08	7.66	6.86
EH99SM1 28	2.47	42.90	3.00	1.00	*	*	*	*	*	*
EH56SM1 61	40.41	41.50	7.39	6.92	64.24	62.80	455.76	419.84	9.82	9.42
EH99SM2 132	2.47	42.60	3.00	1.00	*	*	*	*	*	*
EH99SM3 254	2.47	42.60	3.00	1.00	*	*	*	*	*	*
EH99SM4 370	2.46	42.50	3.00	1.00	*	*	*	*	*	*
EH99SM5 511	2.48	42.60	2.99	1.00	*	*	*	*	*	*
EH99SM6 624	2.45	42.60	2.98	1.00	*	*	*	*	*	*
EH99SM7 743	2.46	43.00	2.99	1.00	62.88	*	744.83	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
			SODIUM CHLORIDE	10.0%	23°C					
EL01SM2 1	2.21	39.60	3.00	1.00	66.32	64.72	403.92	418.16	8.66	7.70
EL01SM3 1	2.19	39.30	3.00	1.00	63.44	65.00	449.04	419.00	8.50	8.86
EL01SM1 1	2.19	39.40	3.00	1.00	67.10	64.72	428.50	418.40	9.02	8.78
EL07SM2 7	2.23	39.10	3.00	1.00	58.04	52.47	436.40	434.16	8.28	7.70
EL07SM3 7	2.23	39.20	3.00	1.00	57.14	53.13	404.48	442.80	8.40	7.61
EL07SM1 7	2.27	40.40	3.00	1.00	52.95	60.87	441.04	431.76	8.12	7.65
EL14SM1 14	38.59	39.70	7.40	6.95	62.40	61.84	406.80	404.40	7.42	7.70
EL14SM3 15	2.25	39.90	3.00	1.00	55.42	60.82	398.00	381.12	8.34	8.31
EL14SM2 15	2.15	38.90	3.01	1.01	56.14	62.58	390.96	417.52	8.88	8.71
EL99SM1 28	2.42	42.40	3.00	1.00	*	*	*	*	*	*
EL28SM3 28	39.61	40.10	7.41	6.93	65.04	58.32	401.84	401.12	7.46	8.06
EL28SM2 28	39.82	40.40	7.42	6.96	63.76	65.36	423.92	482.56	7.98	7.30
EL28SM1 28	38.75	39.60	7.43	6.92	60.56	57.04	449.44	430.48	8.10	7.86
EL56SM2 56	36.80	37.20	7.43	6.97	59.44	65.52	423.28	421.12	8.06	9.14
EL56SM3 56	38.39	39.00	7.35	6.99	62.80	64.40	441.76	404.88	7.74	8.42
EL56SM1 61	42.31	43.20	7.46	6.94	64.88	67.28	432.80	428.56	8.94	8.30
EL99SM2 132	2.42	42.10	3.00	1.00	*	*	*	*	*	*
EL99SM3 246	2.42	41.90	3.00	1.01	*	*	*	*	*	*
EL99SM4 370	2.43	42.00	3.00	1.00	*	*	*	*	*	*
EL99SM5 511	2.44	42.00	3.00	1.00	*	*	*	*	*	*
EL99SM6 624	2.41	41.90	2.99	1.00	*	*	*	*	*	*
EL99SM7 738	2.41	42.00	3.00	1.00	59.20	*	809.75	*	*	*
			WATER	100.0%	50°C					
EH01WP1 1	2.04	36.40	2.96	1.00	66.10	71.60	352.60	364.08	8.62	8.50
EH07WP1 7	2.38	41.00	3.01	1.00	58.96	65.20	436.60	413.10	8.54	8.34
EH14WP1 14	36.00	37.50	7.45	6.92	56.40	58.70	448.00	429.70	6.65	8.54
EH28WP1 28	2.35	40.50	3.00	1.00	65.52	64.72	438.64	412.96	8.70	8.06
EH99WP1 28	2.54	43.80	3.01	1.00	*	*	*	*	*	*
EH56WP1 56	40.57	41.20	7.44	6.95	62.16	60.08	446.00	424.48	8.18	7.14
EH99WP2 133	2.57	43.90	3.02	1.00	*	*	*	*	*	*
EH99WP3 254	2.62	44.40	3.04	1.01	*	*	*	*	*	*
EH99WP4 370	2.61	44.60	3.04	1.01	*	*	*	*	*	*
EH99WP5 503	2.62	44.40	3.05	1.01	*	*	*	*	*	*
EH99WP6 622	2.63	44.50	3.04	1.02	*	*	*	*	*	*
EH99WP7 743	2.63	44.60	3.05	1.02	62.75	*	704.92	*	*	*
			WATER	100.0%	23°C					
EL01WP2 1	2.05	36.50	3.00	1.00	69.70	65.04	436.10	422.24	8.46	8.38
EL01WP1 1	1.93	34.20	3.00	1.00	66.64	65.36	424.88	406.80	8.42	8.02
EL01WP3 1	2.09	37.40	3.00	1.00	69.04	66.64	435.28	433.44	8.42	7.78
EL07WP2 7	2.27	40.00	2.94	1.00	61.04	64.40	447.90	420.16	9.06	8.00
EL07WP1 7	2.34	40.30	3.01	1.00	61.40	59.60	435.60	412.60	8.22	8.62
EL07WP3 7	2.31	39.80	3.00	1.00	61.50	58.32	423.00	398.32	8.78	6.60
EL14WP1 14	35.41	40.70	7.41	6.94	53.90	54.90	426.00	407.00	8.60	6.60
EL14WP2 14	2.49	43.50	3.00	1.00	64.56	70.32	420.00	334.96	9.02	9.10

ETHYLENE PROPYLENE DIENE MONOMER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
WATER 100.0% 23°C										
EL14WP3 14	2.50	43.60	3.00	1.00	68.88	70.80	436.48	399.20	9.14	9.06
EL28WP1 28	2.26	39.20	3.00	1.00	66.48	70.48	433.28	408.88	9.06	8.34
EL99WP1 28	2.49	43.20	3.00	1.00	*	*	*	*	*	*
EL28WP2 28	1.98	34.90	3.00	1.00	65.52	61.68	422.80	422.72	9.50	8.86
EL28WP3 28	2.00	35.30	3.00	1.00	65.84	64.88	452.72	421.04	9.74	8.18
EL56WP3 56	2.49	43.20	3.01	1.00	66.26	65.66	427.76	396.80	9.22	8.89
EL56WP2 56	2.53	43.70	3.01	1.00	61.35	61.13	450.88	416.08	9.31	9.15
EL56WP1 56	45.29	46.40	7.36	6.98	72.08	71.92	440.08	436.40	9.50	9.50
EL99WP2 132	2.51	43.00	3.01	1.00	*	*	*	*	*	*
EL99WP3 246	2.48	43.30	3.04	1.03	*	*	*	*	*	*
EL99WP4 370	2.52	43.30	3.01	1.01	*	*	*	*	*	*
EL99WP5 503	2.51	43.00	3.02	1.00	*	*	*	*	*	*
EL99WP6 622	2.51	43.40	3.01	1.01	*	*	*	*	*	*
EL99WP7 738	2.51	43.60	3.02	1.01	57.90	*	747.83	*	*	*
POTASSIUM DICHROMATE 10.0% 50°C										
EH01XM1 1	2.00	34.90	3.00	1.00	70.33	57.74	468.08	434.48	8.47	9.65
EH07XM1 7	2.77	48.20	2.99	1.00	62.14	67.75	442.64	424.96	8.83	6.73
EH14XM1 14	2.52	44.10	3.01	1.00	69.37	73.94	451.60	428.40	7.75	9.33
EH99XM1 28	2.49	43.10	3.00	1.00	*	*	*	*	*	*
EH28XM1 28	2.30	40.30	3.00	1.00	73.58	72.02	417.76	446.80	8.23	9.31
EH56XM1 56	2.30	40.20	3.01	1.01	51.78	60.52	462.80	442.64	8.33	7.13
EH99XM2 118	2.48	43.50	3.01	1.00	*	*	*	*	*	*
EH99XM3 231	2.52	43.50	3.01	1.00	*	*	*	*	*	*
EH99XM4 363	2.53	43.40	3.01	1.00	*	*	*	*	*	*
EH99XM5 489	2.53	43.70	3.01	1.00	*	*	*	*	*	*
EH99XM6 609	2.53	43.90	3.01	1.00	*	*	*	*	*	*
EH99XM7 720	2.54	43.50	3.01	1.00	64.86	*	724.67	*	*	*
POTASSIUM DICHROMATE 10.0% 23°C										
EL01XM2 1	1.94	33.60	3.01	1.00	70.74	75.53	437.28	446.88	9.13	8.58
EL01XM1 1	2.07	36.20	3.00	1.00	76.46	64.66	474.32	393.52	9.75	7.84
EL01XM3 1	2.06	35.90	3.00	1.01	74.89	74.25	457.12	428.08	9.27	8.67
EL07XM3 7	2.69	46.70	3.01	1.00	70.23	69.37	460.64	418.72	8.13	9.06
EL07XM1 7	2.07	35.70	3.00	1.00	66.30	68.38	441.20	440.24	8.82	6.94
EL07XM2 7	2.25	39.00	3.00	1.00	59.00	61.11	452.56	417.12	7.36	7.84
EL14XM3 14	1.93	33.60	3.00	1.00	71.21	63.74	450.16	455.68	7.30	8.69
EL14XM1 14	2.19	39.10	3.00	1.00	66.62	69.46	426.88	435.28	8.88	9.65
EL14XM2 14	2.11	36.40	3.00	1.00	76.41	74.31	458.32	479.12	7.58	9.62
EL28XM2 28	2.29	39.60	3.00	1.00	69.43	65.88	485.04	489.40	8.28	8.81
EL28XM3 28	2.46	42.40	3.00	1.00	64.06	65.04	467.28	489.20	8.75	7.91
EL99XM1 28	2.17	37.60	3.00	1.00	*	*	*	*	*	*
EL28XM1 28	2.18	38.80	3.00	1.00	74.74	74.12	430.40	448.80	8.44	8.76
EL56XM3 56	*	40.40	3.01	1.00	63.02	59.51	461.76	435.92	9.05	8.75
EL56XM2 56	*	35.30	3.00	1.00	60.98	68.65	455.04	428.48	8.86	7.88
EL56XM1 56	2.53	44.40	3.01	1.00	67.77	59.61	444.64	445.04	7.70	8.65
EL99XM2 118	2.17	37.50	3.00	1.00	*	*	*	*	*	*

```
EL99XM3 223     2.16     37.60     3.01     1.00       *          *          *          *        *        *
EL99XM4 363     2.17     37.60     3.01     1.00       *          *          *          *        *        *
EL99XM5 489     2.16     37.60     3.01     1.00       *          *          *          *        *        *
EL99XM6 609     2.16     37.60     3.00     1.00       *          *          *          *        *        *
EL99XM7 715     2.16     37.70     3.00     1.00     53.78        *       828.42       *        *        *
```

EPDM :   STATISTICS

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

		NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
HYDROCHLORIC ACID 10.0% 50°C													
EH01AM1	1	5	1.430	5	2.710	5	15.170	5	36.430	5	0.420	5	0.330
EH07AM1	7	5	1.090	5	1.510	5	12.130	5	8.520	5	0.440	5	0.480
EH14AM1	14	5	1.490	5	2.260	5	15.480	5	15.140	5	0.570	5	0.400
EH28AM1	27	5	1.700	5	0.790	5	12.800	5	6.280	5	0.450	5	0.530
EH56AM1	56	5	1.070	5	2.070	5	5.170	5	9.980	5	*	5	0.550
HYDROCHLORIC ACID 10.0% 23°C													
EL01AM1	1	5	5.890	5	5.170	5	0.510	5	42.660	5	0.460	5	0.580
EL01AM2	1	5	1.660	5	1.040	5	5.680	5	32.500	5	0.670	5	0.420
EL01AM3	1	5	1.260	5	1.730	5	12.540	5	17.200	5	0.110	5	0.240
EL07AM2	7	5	1.530	5	1.492	5	7.420	5	14.540	5	0.460	5	0.390
EL07AM3	7	5	2.160	5	1.310	5	26.400	5	10.720	5	0.340	5	0.530
EL07AM1	7	5	1.330	5	4.800	5	15.720	5	35.600	5	0.460	5	0.250
EL14AM1	14	5	1.340	5	1.510	5	12.000	5	18.050	5	0.520	5	0.290
EL14AM2	14	5	4.310	5	2.090	5	38.950	5	10.500	5	0.220	5	0.280
EL14AM3	14	5	6.790	5	1.800	5	68.640	5	11.920	5	0.150	5	0.400
EL28AM1	27	4	2.891	5	2.960	4	24.867	5	23.310	5	0.420	5	0.350
EL28AM2	27	5	1.840	5	1.070	5	11.280	5	9.400	5	0.220	5	0.500
EL28AM3	27	5	1.140	5	1.340	5	9.270	5	17.460	5	0.190	5	0.180
EL56AM2	56	5	0.670	5	1.340	5	10.910	5	8.900	5	0.270	5	0.370
EL56AM3	56	5	2.850	5	1.340	5	16.660	5	17.420	5	0.580	5	0.300
EL56AM1	56	4	0.924	5	3.500	4	18.965	5	25.600	5	0.560	5	0.360
SODIUM HYDROXIDE 10.0% 50°C													
EH01BM1	1	5	0.233	5	1.341	5	5.295	5	14.897	5	0.267	5	0.199
EH07BM1	7	5	1.622	5	2.584	5	5.394	5	23.838	5	0.615	5	0.195
EH14BM1	14	5	1.884	5	2.209	5	16.919	5	15.647	5	0.140	5	0.145
EH28BM1	28	5	1.501	5	1.973	5	15.230	5	6.912	5	0.165	5	0.331
EH56BM1	56	5	0.788	5	2.397	5	7.255	5	18.863	5	0.462	5	0.164
SODIUM HYDROXIDE 10.0% 23°C													
EL01BM2	1	5	7.860	5	2.261	5	66.481	5	23.665	5	0.541	5	0.199
EL01BM3	1	5	3.744	5	2.270	5	15.270	5	3.607	5	0.305	5	0.264
EL01BM1	1	5	3.636	5	3.848	5	20.888	5	5.599	5	0.442	5	0.487
EL07BM2	7	5	1.440	5	4.091	5	10.932	5	24.932	5	0.089	5	0.256
EL07BM1	7	5	0.758	5	1.912	5	9.795	5	12.903	5	0.473	5	0.373
EL07BM3	7	5	4.243	5	1.552	5	39.601	5	10.315	5	0.191	5	0.068
EL14BM1	14	5	1.311	5	1.860	5	14.878	5	20.130	5	0.125	5	0.207
EL14BM2	14	5	4.373	5	4.502	5	48.380	5	30.578	5	0.074	5	0.530
EL14BM3	14	5	1.434	5	2.475	5	50.995	5	21.452	5	0.063	5	0.162
EL28BM1	28	5	1.302	5	2.695	5	9.894	5	29.491	5	0.268	5	0.243
EL28BM2	28	5	1.199	5	1.419	5	9.207	5	7.965	5	0.649	5	0.778
EL28BM3	28	5	3.351	5	1.329	5	20.586	5	10.946	5	0.471	5	0.119

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
SODIUM HYDROXIDE 10.0% 23°C												
EL56BM3 56	5	1.430	5	1.243	5	12.632	5	15.447	5	0.381	5	0.152
EL56BM2 56	5	1.252	5	1.599	5	10.984	5	13.481	5	0.097	5	0.255
EL56BM1 56	5	1.280	5	4.526	5	7.801	5	29.997	5	0.229	5	0.191
1 2 DICHLOROETHANE .8% 50°C												
EH01DH1 1	5	1.325	5	1.013	5	14.391	5	15.144	5	0.343	5	0.205
EH07DH1 7	5	1.960	5	1.860	5	13.380	5	16.830	5	0.380	5	0.250
EH14DH1 14	5	1.610	5	1.730	5	20.380	5	6.030	5	0.270	5	0.230
EH28DH1 28	5	1.913	5	2.931	5	7.512	5	10.406	5	0.239	5	0.170
EH56DH1 56	5	4.322	5	5.173	5	10.449	5	10.549	5	0.168	5	0.251
1 2 DICHLOROETHANE .8% 23°C												
EL01DH2 1	5	1.289	5	3.254	5	29.019	5	26.410	5	0.162	5	0.117
EL01DH3 1	5	3.279	5	1.809	5	19.227	5	9.355	5	0.176	5	0.176
EL01DH1 1	5	3.341	5	1.957	5	19.916	5	23.919	5	0.178	5	0.120
EL07DH1 7	5	1.850	5	1.320	5	10.380	5	23.500	5	0.590	5	0.570
EL07DH3 7	5	3.150	0	*	5	22.500	0	*	5	0.210	5	0.380
EL07DH2 7	5	3.700	5	1.510	5	41.000	5	20.200	5	0.600	5	0.120
EL14DH1 14	5	1.940	5	1.680	0	*	0	*	5	0.240	5	0.250
EL14DH3 14	5	2.970	5	1.950	5	9.130	5	19.200	5	0.160	5	0.190
EL14DH2 14	5	0.940	5	1.900	5	11.550	5	13.900	5	0.180	5	0.210
EL28DH1 28	5	0.318	5	1.033	5	13.156	5	6.083	5	0.096	5	0.054
EL28DH2 28	5	2.644	5	2.060	5	35.408	5	28.355	5	0.206	5	0.327
EL28DH3 28	5	8.737	5	8.550	5	16.016	5	14.938	5	0.463	5	0.291
EL56DH2 56	5	1.802	5	1.317	5	23.583	5	11.040	5	0.328	5	0.338
EL56DH3 56	5	3.659	5	3.798	5	17.263	5	18.396	5	0.406	5	0.337
EL56DH1 56	5	4.394	5	2.529	5	38.550	5	6.387	5	0.287	5	0.125
1 2 DICHLOROETHANE .1% 50°C												
EH01DL1 1	5	2.293	5	1.434	5	25.717	5	12.886	5	0.306	5	0.129
EH07DL1 7	5	2.230	5	1.180	5	16.730	5	11.340	5	0.170	5	0.490
EH14DL1 14	5	2.460	5	3.910	0	*	0	*	5	0.230	5	0.070
EH28DL1 28	5	3.546	5	1.331	5	16.809	5	18.151	5	0.201	5	0.123
EH56DL1 56	5	0.689	5	1.927	5	17.301	5	8.032	5	0.300	5	0.286
1 2 DICHLOROETHANE .1% 23°C												
EL01DL3 1	5	3.128	5	3.206	5	14.447	5	14.897	5	0.101	5	0.179
EL01DL2 1	5	1.308	5	2.139	5	10.936	5	11.501	5	0.221	5	0.535
EL01DL1 1	5	1.666	5	0.993	5	39.123	5	7.272	5	0.190	5	0.104
EL07DL2 7	5	1.810	5	3.100	5	10.370	5	16.740	5	0.100	5	0.250
EL07DL1 7	5	1.130	5	1.090	5	8.580	5	14.430	5	0.340	5	0.330
EL07DL3 7	5	1.520	5	2.010	5	12.270	5	44.560	5	0.230	5	0.460
EL14DL2 14	5	2.400	5	2.460	5	30.100	5	18.500	5	0.238	5	0.179
EL14DL1 14	5	1.400	5	2.200	0	*	0	*	5	0.280	5	0.300

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
1 2 DICHLOROETHANE .1% 23°C												
EL14DL3 14	5	6.000	5	3.590	5	30.910	5	19.480	5	0.210	5	0.230
EL28DL1 28	5	1.199	5	2.856	5	9.036	5	19.230	5	0.273	5	0.174
EL28DL2 28	5	3.634	5	1.452	5	18.286	5	5.214	5	0.234	5	0.217
EL28DL3 28	5	1.100	5	1.209	5	9.916	5	19.297	5	0.065	5	0.178
EL56DL1 56	5	1.088	5	1.837	5	21.942	5	7.883	5	0.342	5	0.462
EL56DL2 56	5	4.652	5	1.375	5	47.094	5	28.878	5	0.216	5	0.275
EL56DL3 56	5	1.046	5	1.111	5	22.817	5	15.291	5	0.479	5	0.229
1 2 DICHLOROETHANE .5% 50°C												
EH01DM1 1	5	1.256	5	1.485	5	18.566	5	9.215	5	0.090	5	0.138
EH07DM1 7	5	1.440	5	1.690	5	17.800	5	12.920	5	0.290	5	0.290
EH14DM1 14	5	5.860	5	5.240	5	37.100	0	*	5	0.150	5	0.250
EH28DM1 28	5	1.417	5	2.654	5	18.522	5	22.637	5	0.142	5	0.129
EH56DM1 56	5	0.452	5	2.078	5	8.618	5	15.405	5	0.376	5	0.215
1 2 DICHLOROETHANE .5% 23°C												
EL01DM3 1	5	1.955	5	0.883	5	27.333	5	24.715	5	1.197	5	0.303
EL01DM2 1	5	0.905	5	2.329	5	19.487	5	18.540	5	0.153	5	0.220
EL01DM1 1	5	4.864	5	1.824	5	45.210	5	23.072	5	0.286	5	0.197
EL07DM2 7	5	3.360	5	0.740	5	29.500	5	10.000	5	0.320	5	0.590
EL07DM1 7	5	3.710	5	3.270	5	9.660	5	33.430	5	0.230	5	0.150
EL07DM3 7	5	3.470	5	1.040	5	31.840	5	20.900	5	0.150	5	0.250
EL14DM2 14	5	1.690	5	0.910	5	19.400	5	8.100	5	0.100	5	0.190
EL14DM3 14	5	2.510	5	2.400	5	18.700	5	6.800	5	0.170	5	0.230
EL14DM1 14	5	2.080	5	2.470	0	*	0	*	5	0.200	5	0.216
EL28DM2 28	5	1.511	5	2.103	5	10.716	5	20.304	5	0.186	5	0.276
EL28DM1 28	5	1.486	5	1.332	5	18.109	5	23.916	5	0.337	5	0.249
EL28DM3 28	5	2.116	5	0.790	5	34.877	5	9.924	5	0.091	5	0.149
EL56DM3 56	5	0.809	5	1.023	5	12.501	5	14.555	5	0.141	5	0.170
EL56DM2 56	5	1.299	5	1.320	5	17.411	5	14.256	5	0.193	5	0.232
EL56DM1 56	5	0.755	5	0.858	5	19.791	5	8.547	5	0.150	5	0.188
FURFURAL 8.0% 50°C												
EH01FH1 1	5	4.097	5	5.320	5	31.560	5	48.710	5	0.239	5	0.277
EH07FH1 7	5	3.067	5	1.851	5	26.400	5	8.200	5	0.370	5	0.402
EH14FH1 14	5	1.906	5	4.182	5	43.490	5	39.740	5	0.321	5	0.084
EH28FH1 28	5	3.694	5	2.056	5	32.140	5	26.890	5	0.396	5	0.259
EH56FH1 56	5	2.958	5	1.459	5	28.230	5	8.200	5	0.120	5	0.332
FURFURAL 8.0% 23°C												
EL01FH3 1	5	3.146	5	2.489	5	13.201	5	8.167	5	1.083	5	0.782
EL01FH1 1	5	0.870	5	1.356	5	10.000	5	15.070	5	0.839	5	0.949
EL01FH2 1	5	3.226	5	0.829	5	21.584	5	9.887	5	0.622	5	0.200
EL07FH2 7	5	0.890	5	0.963	5	10.920	5	4.380	5	0.552	5	0.611

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
FURFURAL 8.0% 23°C												
EL07FH3 7	5	2.270	5	0.358	5	26.830	5	8.940	5	0.624	5	1.657
EL07FH1 7	5	2.418	5	1.918	5	33.750	5	50.230	5	0.631	5	0.730
EL14FH2 14	5	3.633	5	1.711	5	20.510	5	23.080	5	0.216	5	0.044
EL14FH1 14	5	2.704	5	2.748	5	39.940	5	21.240	5	0.192	5	0.152
EL14FH3 14	5	4.320	5	2.870	5	27.330	5	1.790	5	0.245	5	0.126
EL28FH3 28	5	2.809	5	0.669	5	46.850	5	16.400	5	0.212	5	0.195
EL28FH1 28	5	1.080	5	2.440	5	7.500	5	30.800	5	0.243	5	0.329
EL28FH2 28	5	1.775	5	1.403	5	12.460	5	32.200	5	0.179	5	0.187
EL56FH2 56	5	5.356	5	3.622	5	25.980	5	25.610	5	0.371	5	0.332
EL56FH1 56	5	3.041	5	2.390	5	9.960	5	29.180	5	0.200	5	0.182
EL56FH3 56	5	2.308	5	4.112	5	33.660	5	36.220	5	0.186	5	0.217
FURFURAL 1.0% 50°C												
EH01FL1 1	5	3.470	5	2.366	5	1.510	5	7.100	5	0.542	5	2.163
EH07FL1 7	5	2.498	5	5.228	5	10.430	5	47.780	5	0.297	5	0.799
EH14FL1 14	5	5.847	5	4.358	5	11.870	5	12.840	5	0.297	5	1.489
EH28FL1 28	5	2.347	5	1.478	5	29.750	5	16.490	5	0.135	5	0.065
EH56FL1 56	5	2.147	5	2.377	5	18.550	5	33.060	5	0.160	5	0.471
FURFURAL 1.0% 23°C												
EL01FL3 1	5	2.628	5	4.325	5	19.335	5	14.330	5	0.472	5	1.794
EL01FL2 1	5	3.414	5	0.495	5	28.792	5	11.155	5	0.117	5	2.994
EL01FL1 1	5	3.262	5	1.978	5	18.365	5	13.027	5	0.353	5	0.838
EL07FL2 7	5	1.324	5	0.829	5	4.480	5	19.920	5	0.084	5	0.658
EL07FL1 7	5	1.489	5	2.265	5	33.820	5	5.930	5	0.611	5	0.607
EL07FL3 7	5	3.638	5	2.143	5	29.200	5	15.770	5	0.359	5	0.977
EL14FL2 14	5	2.390	5	2.608	5	4.900	5	15.650	5	0.297	5	0.261
EL14FL3 14	5	2.972	5	1.720	5	65.480	5	13.680	5	0.245	5	0.245
EL14FL1 14	5	3.893	5	3.700	5	21.430	5	5.660	5	0.171	5	0.806
EL28FL2 28	5	1.931	5	1.951	5	17.570	5	20.780	5	0.126	5	0.114
EL28FL1 28	5	2.514	5	2.291	5	20.860	5	15.900	5	0.342	5	0.195
EL28FL3 28	5	2.780	5	2.238	5	11.800	5	22.380	5	0.148	5	0.152
EL56FL3 56	5	6.167	5	1.035	5	68.060	5	13.450	5	0.262	5	0.179
EL56FL2 56	5	3.142	5	2.305	5	45.130	5	23.660	5	0.254	5	0.217
EL56FL1 56	5	2.393	5	1.857	5	17.340	5	24.430	5	0.286	5	0.249
FURFURAL 4.0% 50°C												
EH01FM1 1	5	1.851	5	1.953	5	8.602	5	22.925	5	0.590	5	1.342
EH07FM1 7	5	2.013	5	3.131	5	11.400	5	23.900	5	0.342	5	0.683
EH14FM1 14	5	2.179	5	2.455	5	11.100	5	12.130	5	0.557	5	0.898
EH28FM1 28	5	4.040	5	2.806	5	52.730	5	17.800	5	0.411	5	0.182
EH56FM1 56	5	2.653	5	1.753	5	26.520	5	12.840	5	0.144	5	0.074

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

		NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
FURFURAL 4.0% 23°C													
EL01FM1	1	5	1.625	5	2.265	5	11.828	5	9.235	5	0.445	5	1.578
EL01FM2	1	5	0.974	5	1.290	5	6.447	5	10.283	5	0.850	5	0.921
EL01FM3	1	5	3.520	5	3.273	5	17.410	5	24.692	5	1.310	5	1.310
EL07FM3	7	5	2.257	5	1.117	5	18.710	5	13.970	5	0.327	5	0.681
EL07FM2	7	5	2.305	5	1.990	5	17.530	5	16.150	5	0.217	5	1.426
EL07FM1	7	5	1.757	5	0.548	5	10.950	5	25.080	5	0.328	5	1.234
EL14FM1	14	5	2.787	5	1.604	5	19.920	5	32.000	5	0.589	5	1.330
EL14FM2	14	5	2.567	5	3.615	5	10.950	5	51.410	5	0.130	5	0.110
EL14FM3	14	5	1.980	5	2.165	5	24.750	5	16.170	5	0.192	5	0.303
EL28FM2	28	5	1.020	5	1.425	5	16.590	5	16.730	5	0.152	5	0.279
EL28FM3	28	5	1.265	5	1.720	5	3.580	5	10.810	5	0.192	5	0.207
EL28FM1	28	5	2.373	5	1.487	5	22.160	5	16.490	5	0.161	5	0.230
EL56FM1	56	5	1.277	5	3.400	5	13.740	5	36.220	5	0.320	5	0.404
EL56FM2	56	5	1.368	5	3.378	5	15.390	5	30.540	5	0.285	5	0.266
EL56FM3	56	5	4.036	5	2.865	5	51.410	5	27.940	5	0.371	5	0.480
METHYL ETHYL KETONE 26.0% 50°C													
EH01MH1	1	5	1.840	5	3.810	5	9.260	5	60.370	5	0.510	5	0.660
EH07MH1	7	5	2.373	5	3.118	5	12.010	5	7.473	5	0.447	5	0.748
EH14MH1	14	5	2.086	5	2.162	5	12.540	5	17.680	5	0.583	5	0.910
EH28MH1	28	5	1.361	5	0.802	5	18.102	5	10.325	5	0.474	5	0.408
EH56MH1	57	5	1.440	5	1.307	5	11.770	5	7.910	5	0.310	5	0.574
METHYL ETHYL KETONE 26.0% 23°C													
EL01MH1	1	5	2.370	5	3.128	5	10.310	5	21.158	5	0.179	5	0.303
EL01MH3	1	5	1.129	5	2.566	5	9.535	5	13.493	5	0.219	5	0.335
EL01MH2	1	5	1.338	5	3.422	5	13.466	5	24.350	5	0.252	5	0.179
EL07MH3	7	5	1.042	5	0.911	5	14.490	5	15.410	5	0.681	5	0.555
EL07MH1	7	5	1.315	5	1.960	5	12.995	5	18.280	5	0.447	5	0.460
EL07MH2	7	5	2.007	5	2.359	5	12.640	5	8.130	5	0.374	5	0.607
EL14MH1	14	5	2.084	5	1.909	5	14.026	5	8.859	5	0.841	5	0.400
EL14MH2	14	5	2.652	5	2.591	5	25.240	5	19.970	5	0.490	5	0.890
EL14MH3	14	5	1.658	5	3.861	5	8.235	5	23.869	5	0.540	5	0.623
EL28MH2	28	5	3.156	4	1.030	5	24.169	4	11.048	5	0.312	5	0.378
EL28MH3	28	5	1.217	5	0.752	5	17.114	5	10.273	5	0.579	5	0.249
EL28MH1	28	5	2.390	5	2.383	5	32.098	5	26.901	5	0.557	5	0.549
EL56MH1	57	5	2.480	5	1.950	5	12.390	5	9.690	5	0.236	5	0.375
EL56MH2	57	5	2.070	5	1.065	5	31.368	5	14.764	5	0.237	5	0.227
EL56MH3	57	5	1.679	5	2.290	5	11.191	5	11.113	5	0.368	5	0.403
METHYL ETHYL KETONE 3.0% 50°C													
EH01ML1	1	5	3.316	5	1.260	5	39.050	5	31.860	5	0.383	5	0.230
EH07ML1	7	5	3.077	5	3.726	5	21.183	5	18.997	5	0.694	5	0.424
EH14ML1	14	5	1.071	5	3.118	5	15.810	5	7.210	5	0.228	5	0.576
EH28ML1	28	5	2.890	5	1.411	5	25.584	5	10.224	5	0.263	5	0.184
EH56ML1	57	5	2.420	5	3.140	5	5.210	5	15.870	5	0.326	5	0.602

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
METHYL ETHYL KETONE 3.0% 23°C												
EL01ML2 1	5	2.620	5	3.100	5	16.300	5	29.100	5	0.330	5	0.434
EL01ML3 1	5	4.210	5	3.270	5	18.560	5	28.300	5	0.300	5	0.360
EL01ML1 1	5	1.750	5	2.650	5	4.450	5	17.900	5	0.580	5	0.240
EL07ML1 7	5	1.753	5	2.160	5	20.940	5	20.410	5	0.358	5	0.261
EL07ML3 7	5	1.919	5	3.327	5	10.663	5	20.108	5	0.800	5	0.400
EL07ML2 7	5	2.373	5	1.438	5	6.630	5	25.108	5	0.748	5	0.363
EL14ML2 14	5	1.131	5	1.876	5	10.510	5	17.202	5	0.473	5	0.385
EL14ML3 14	5	2.425	5	2.303	5	21.498	5	8.680	5	0.456	5	0.490
EL14ML1 14	5	1.315	5	1.992	5	9.155	5	19.049	5	0.529	5	0.490
EL28ML3 28	5	2.879	5	3.532	5	16.817	5	10.850	5	0.156	5	0.497
EL28ML2 28	5	3.049	5	2.124	5	25.552	5	20.287	5	0.333	5	0.331
EL28ML1 28	5	5.953	5	3.519	5	63.711	5	29.333	5	0.199	5	0.312
EL56ML1 57	5	1.790	5	1.770	5	23.730	5	18.398	5	0.360	5	0.272
EL56ML3 57	5	1.530	5	3.930	5	28.860	5	35.300	5	0.398	5	0.570
EL56ML2 57	5	3.320	5	2.160	5	21.560	5	17.024	5	0.350	5	0.404
METHYL ETHYL KETONE 13.0% 50°C												
EH01MM1 1	5	3.320	5	2.430	5	15.200	5	10.550	5	0.170	5	0.410
EH07MM1 7	5	1.910	5	1.310	5	21.420	5	5.760	5	0.464	5	0.502
EH14MM1 14	5	1.910	5	2.690	5	10.046	5	33.350	5	1.220	5	0.576
EH28MM1 28	5	2.436	5	2.872	5	19.850	5	22.312	5	0.215	5	0.108
EH56MM1 57	5	4.450	5	3.630	5	23.480	5	14.070	5	0.310	5	0.170
METHYL ETHYL KETONE 13.0% 23°C												
EL01MM3 1	5	2.750	5	2.850	5	27.150	5	29.290	5	0.300	5	0.330
EL01MM2 1	5	2.930	5	4.560	5	9.420	5	44.040	5	0.260	5	0.410
EL01MM1 1	5	0.670	5	0.710	5	7.220	5	10.160	5	0.300	5	0.330
EL07MM1 7	5	3.269	5	0.353	5	31.780	5	6.870	5	0.677	5	0.548
EL07MM2 7	5	2.069	5	2.737	5	15.950	5	18.230	5	0.400	5	0.179
EL07MM3 7	0	*	0	*	0	*	0	*	5	0.329	5	0.713
EL14MM3 14	5	3.374	5	2.160	5	13.900	5	21.390	5	1.170	5	1.213
EL14MM1 14	5	2.160	5	2.358	5	13.218	5	24.276	5	0.576	5	0.447
EL14MM2 14	5	1.454	5	1.640	5	9.260	5	22.147	5	0.261	5	0.280
EL28MM2 28	5	7.544	5	2.759	5	******	5	18.398	5	0.282	5	0.699
EL28MM1 28	5	1.000	5	1.115	5	9.847	5	9.653	5	0.218	5	0.381
EL28MM3 28	5	0.780	5	6.030	5	11.332	5	50.397	5	0.351	5	0.207
EL56MM1 57	5	3.059	5	0.936	5	22.508	5	4.880	5	0.243	5	0.355
EL56MM2 57	5	4.144	5	3.740	5	26.910	5	29.960	5	0.437	5	0.330
EL56MM3 57	5	0.860	5	4.370	5	4.880	5	11.410	5	0.420	5	0.593

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
ASTM #2 OIL SATURATED 50°C												
EH010M1 1	5	3.613	5	3.585	5	14.283	5	16.046	5	0.338	5	0.518
EH070M1 7	5	1.193	5	1.352	5	14.290	5	15.083	5	0.624	5	0.765
EH140M1 14	5	4.320	5	4.761	5	33.520	5	10.007	5	0.334	5	0.515
EH280M1 28	5	4.400	5	2.800	5	20.000	5	20.000	5	0.100	5	0.300
EH560M1 56	5	1.151	5	1.118	5	10.801	5	14.783	5	0.248	5	0.348
ASTM #2 OIL SATURATED 23°C												
EL010M3 1	5	0.925	5	1.965	5	18.584	5	10.980	5	0.195	5	0.151
EL010M1 1	5	4.419	5	4.280	5	27.944	5	25.976	5	0.495	5	0.717
EL010M2 1	5	1.114	5	2.697	5	5.058	5	18.360	5	0.197	5	0.246
EL070M2 7	5	1.396	5	2.500	5	7.704	5	24.241	5	0.162	5	0.409
EL070M3 7	5	2.298	5	2.292	5	25.225	5	21.071	5	0.432	5	1.272
EL070M1 7	5	1.134	5	0.601	5	72.356	5	11.819	5	0.838	5	0.453
EL140M1 14	5	4.634	5	4.143	5	15.434	5	12.390	5	0.161	5	0.291
EL140M2 14	5	0.451	5	0.722	5	7.600	5	9.885	5	0.467	5	0.617
EL140M3 14	5	2.278	5	0.705	5	21.171	5	15.382	5	0.242	5	0.217
EL280M2 28	5	1.199	5	2.491	5	11.957	5	11.068	5	0.968	5	0.225
EL280M1 28	5	5.200	5	3.200	5	52.000	5	28.000	5	0.300	5	0.300
EL280M3 28	5	2.969	5	2.546	5	12.933	5	10.010	5	0.531	5	0.395
EL560M2 56	5	3.649	5	2.263	5	59.126	5	9.564	5	0.283	5	0.228
EL560M3 56	5	5.408	5	3.025	5	8.157	5	3.425	5	0.303	5	0.219
EL560M1 56	5	5.978	5	1.096	5	35.696	5	7.155	5	0.127	5	0.259
ASTM #2 OIL 100.0% 50°C												
EH010P1 1	5	3.974	5	2.286	5	19.955	5	23.833	5	1.103	5	0.305
EH070P1 7	5	1.200	5	1.200	5	7.500	8	7.500	5	0.220	5	0.290
EH140P1 14	5	0.800	5	0.640	5	7.500	5	7.000	5	0.110	5	0.280
EH280P1 28	5	1.101	5	1.072	5	8.273	5	18.660	5	0.669	5	0.825
EH560P1 56	5	0.800	5	1.000	5	9.637	5	13.776	5	5.980	5	0.931
ASTM #2 OIL 100.0% 23°C												
EL010P1 1	5	3.599	5	1.880	5	29.332	5	16.142	5	11.010	5	0.483
EL010P3 1	5	1.577	5	1.361	5	18.140	5	9.080	5	8.418	5	8.882
EL010P2 1	5	0.847	5	9.361	5	16.431	5	69.747	5	0.459	5	0.433
EL070P2 7	5	1.228	5	1.228	5	11.242	5	11.242	5	3.310	5	3.310
EL070P3 7	5	1.499	5	1.086	5	15.340	5	15.612	5	7.122	5	0.353
EL070P1 7	5	4.800	5	4.400	5	25.000	5	35.000	5	0.700	5	0.250
EL140P1 14	5	2.000	5	2.000	5	10.000	5	7.500	5	0.200	5	0.110
EL140P2 14	5	3.966	5	2.010	5	17.220	5	9.581	5	0.990	5	0.990
EL140P3 14	5	3.831	5	1.900	5	20.836	5	10.600	5	1.850	5	1.273
EL280P1 28	5	2.034	5	3.224	5	22.444	5	24.861	5	6.334	5	0.540
EL280P2 28	5	0.480	5	1.036	5	6.693	5	7.276	5	1.284	5	0.960
EL280P3 28	5	0.578	4	0.796	5	56.254	4	7.470	5	0.243	5	0.230
EL560P3 55	5	0.912	5	3.640	5	7.310	5	26.863	5	0.303	5	0.363
EL560P2 55	5	0.716	5	0.800	5	7.086	5	7.403	5	0.219	5	0.415
EL560P1 56	5	0.912	5	0.912	5	6.912	5	6.912	5	0.510	5	0.510

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
PHENOL 8.0% 50°C												
EH01PH1 1	5	3.460	5	4.100	5	12.220	5	19.590	5	0.250	5	0.050
EH07PH1 7	5	1.330	5	2.340	5	9.630	5	11.440	5	0.340	5	0.170
EH14PH1 14	5	2.010	5	1.140	5	18.200	5	19.240	5	0.120	5	0.290
EH28PH1 28	5	2.159	5	2.802	5	5.196	5	12.007	5	0.216	5	0.129
EH56PH1 56	5	3.518	5	3.110	5	21.932	5	7.050	5	0.151	5	0.251
PHENOL 8.0% 23°C												
EL01PH3 1	5	2.393	5	2.082	5	8.662	5	7.360	5	0.168	5	0.433
EL01PH1 1	5	0.818	5	1.697	5	6.124	5	11.155	5	0.204	5	0.188
EL01PH2 1	5	0.748	5	0.909	5	11.726	5	15.999	5	0.191	5	0.149
EL07PH2 7	5	2.039	5	1.551	5	7.510	5	12.034	5	0.281	5	0.163
EL07PH3 7	5	1.059	5	1.055	5	8.433	5	9.373	5	0.117	5	0.231
EL07PH1 7	5	2.820	5	4.300	5	17.530	5	8.550	5	0.157	5	0.276
EL14PH1 14	5	1.130	5	1.910	5	15.680	5	24.360	5	0.151	5	0.180
EL14PH3 14	5	1.929	5	1.675	5	12.859	5	8.932	5	0.095	5	0.269
EL14PH2 14	5	1.425	5	1.808	5	13.595	5	14.448	5	0.118	5	0.341
EL28PH3 28	5	3.410	5	2.670	5	14.714	5	13.865	5	0.141	5	0.186
EL28PH1 28	5	9.378	5	7.919	5	25.137	5	12.742	5	0.238	5	0.266
EL28PH2 28	5	1.714	5	3.024	5	14.127	5	34.615	5	0.214	5	0.180
EL56PH1 56	5	3.673	5	2.346	5	16.030	5	8.248	5	0.268	5	0.170
EL56PH2 56	5	1.274	5	2.397	5	20.968	5	11.035	5	0.384	5	0.151
EL56PH3 56	5	2.020	5	1.640	5	26.650	5	17.450	5	0.294	5	0.278
PHENOL 1.0% 50°C												
EH01PL1 1	5	2.900	5	2.000	5	13.420	5	15.320	5	0.103	5	0.110
EH07PL1 7	5	4.313	5	3.675	5	12.402	5	13.984	5	0.167	5	0.228
EH14PL1 14	5	0.445	5	1.930	5	17.280	5	26.480	5	0.270	5	0.450
EH28PL1 28	5	3.272	5	1.212	5	41.967	5	15.721	5	0.131	5	0.176
EH56PL1 56	5	2.455	5	2.310	5	7.379	5	14.610	5	0.167	5	0.453
PHENOL 1.0% 23°C												
EL01PL1 1	5	5.900	5	2.891	5	41.600	5	4.889	5	0.250	5	0.203
EL01PL3 1	5	2.717	5	2.565	5	10.296	5	12.322	5	0.134	5	0.280
EL01PL2 1	5	11.472	5	13.325	5	34.133	5	40.608	5	0.144	5	0.314
EL07PL2 7	5	2.701	5	1.922	5	31.784	5	22.673	5	0.237	5	0.250
EL07PL1 7	5	4.860	5	5.130	5	10.810	5	8.970	5	0.148	5	0.140
EL07PL3 7	5	1.182	5	2.288	5	20.576	5	8.207	5	0.315	5	0.076
EL14PL2 14	5	3.684	5	2.027	5	28.212	5	19.745	5	0.221	5	0.279
EL14PL1 14	5	7.870	5	3.010	5	20.920	5	6.000	5	0.320	5	0.390
EL14PL3 14	5	0.777	5	2.524	5	20.453	5	34.111	5	0.199	5	0.168
EL28PL2 28	5	1.762	5	1.407	5	20.543	5	18.585	5	0.290	5	0.147
EL28PL3 28	5	1.232	5	2.203	5	17.935	5	6.344	5	0.165	5	0.133
EL28PL1 28	5	1.350	5	3.501	5	18.277	5	40.166	5	0.238	5	0.145

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
PHENOL 1.0% 23°C												
EL56PL3 56	5	0.994	5	3.510	5	11.990	5	17.730	5	0.159	5	0.275
EL56PL1 56	5	1.943	5	3.626	5	10.916	5	15.806	5	0.397	5	0.208
EL56PL2 56	5	0.673	5	3.460	5	10.710	5	18.660	5	0.102	5	0.340
PHENOL 4.0% 50°C												
EH01PM1 1	5	1.690	5	1.420	5	6.460	5	19.460	5	0.180	5	0.203
EH07PM1 7	5	1.281	5	1.426	5	21.376	5	21.247	5	0.173	5	0.244
EH14PM1 14	5	2.050	5	2.150	5	10.480	5	14.690	5	0.210	5	0.280
EH28PM1 28	5	0.936	5	1.411	5	8.132	5	15.212	5	0.251	5	0.130
EH56PM1 56	5	0.681	5	2.484	5	16.861	5	12.342	5	0.106	5	0.101
PHENOL 4.0% 23°C												
EL01PM1 1	5	3.023	5	3.324	5	21.264	5	20.400	5	0.057	5	0.200
EL01PM2 1	5	1.333	5	1.395	5	9.907	5	10.384	5	0.422	5	0.093
EL01PM3 1	5	4.135	5	3.825	5	15.816	5	6.996	5	0.411	5	0.469
EL07PM1 7	5	4.280	5	4.690	5	26.890	5	35.100	5	0.130	5	0.212
EL07PM3 7	5	1.400	5	2.330	5	16.600	5	10.740	5	0.102	5	0.163
EL07PM2 7	5	2.710	5	2.078	5	15.380	5	16.616	5	0.165	5	0.232
EL14PM2 14	5	0.370	5	1.001	5	24.410	5	20.560	5	0.103	5	0.054
EL14PM1 14	5	2.096	5	2.690	5	13.470	5	7.660	5	0.233	5	0.290
EL14PM3 14	5	2.610	5	3.404	5	36.585	5	12.049	5	0.158	5	0.270
EL28PM2 28	5	2.175	5	3.273	5	19.139	5	25.599	5	0.181	5	0.208
EL28PM3 28	5	1.047	5	3.189	5	11.618	5	8.609	5	0.295	5	0.157
EL28PM1 28	5	3.681	5	4.267	5	30.421	5	40.393	5	0.267	5	0.105
EL56PM3 56	5	1.290	5	1.080	5	15.390	5	10.150	5	0.307	5	0.070
EL56PM2 56	5	1.830	5	1.230	5	11.450	5	14.520	5	0.230	5	0.220
EL56PM1 56	5	1.708	5	0.441	5	14.356	5	8.213	5	0.227	5	0.131
SODIUM CHLORIDE 35.0% 50°C												
EH01SH1 1	5	4.307	5	2.113	5	20.332	5	13.413	5	0.320	5	0.089
EH07SH1 7	5	1.222	5	0.788	5	17.010	5	6.850	5	0.250	5	0.170
EH14SH1 14	5	3.800	5	3.990	5	35.000	5	7.660	5	0.228	5	0.670
EH28SH1 28	5	1.725	5	2.694	5	17.100	5	18.620	5	0.348	5	0.415
EH56SH1 56	5	1.763	5	2.528	5	9.721	5	11.678	5	0.166	5	0.499
SODIUM CHLORIDE 35.0% 23°C												
EL01SH1 1	5	1.020	5	1.234	5	12.329	5	17.926	5	0.290	5	0.478
EL01SH2 1	5	4.400	5	4.400	5	28.000	5	7.500	5	0.250	5	0.250
EL01SH3 1	5	3.600	5	1.600	5	28.000	5	20.000	5	0.310	5	0.200
EL07SH1 7	5	2.239	5	0.947	5	8.023	5	10.606	5	0.256	5	0.225
EL07SH3 7	5	3.227	5	2.922	5	10.479	5	8.147	5	0.204	5	0.280
EL07SH2 7	5	6.565	5	4.998	5	40.805	5	27.284	5	0.090	5	0.257
EL14SH3 14	5	3.367	5	2.752	5	10.989	5	22.197	5	0.135	5	0.023
EL14SH2 14	5	2.693	5	1.241	5	28.052	5	18.930	5	0.257	5	0.572

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
SODIUM CHLORIDE 35.0% 23°C												
EL14SH1 14	5	3.061	5	0.457	5	44.031	5	5.205	5	0.196	5	0.592
EL28SH2 28	5	3.325	5	5.790	5	10.157	5	16.770	5	0.104	5	0.273
EL28SH3 28	5	3.030	5	3.329	5	25.617	5	19.067	5	0.236	5	0.222
EL28SH1 28	5	0.997	5	1.354	5	6.225	5	23.805	5	0.231	6	0.295
EL56SH3 56	2	*	5	1.600	2	*	5	20.000	5	0.900	5	0.290
EL56SH2 56	5	2.000	5	4.000	5	40.000	5	20.000	5	0.550	5	0.250
EL56SH1 56	5	3.479	5	1.150	5	14.651	5	******	5	0.437	5	0.346
SODIUM CHLORIDE 10.0% 50°C												
EH01SM1 1	5	2.090	5	1.190	5	20.430	5	16.610	5	0.200	5	0.170
EH07SM1 7	5	1.260	5	1.950	5	8.830	5	******	5	0.510	5	0.510
EH14SM1 14	5	1.040	5	2.220	5	12.700	5	19.700	3	0.115	5	0.180
EH28SM1 28	5	2.220	5	1.070	5	10.280	5	10.930	5	0.170	5	0.360
EH56SM1 61	5	1.185	5	2.190	5	13.847	5	17.060	5	0.303	5	0.268
SODIUM CHLORIDE 10.0% 23°C												
EL01SM1 1	5	1.210	5	1.660	5	6.060	5	19.230	5	0.228	5	0.363
EL01SM3 1	5	1.310	5	0.880	5	11.490	5	7.600	5	0.240	5	0.380
EL01SM2 1	5	1.840	5	2.160	5	14.640	5	18.430	5	0.170	5	0.320
EL07SM1 7	5	1.530	5	2.230	5	23.440	5	17.190	5	0.320	5	0.790
EL07SM3 7	5	1.380	5	1.420	5	19.010	5	10.970	5	0.620	5	0.500
EL07SM2 7	5	1.340	5	0.690	5	12.390	5	12.230	5	0.250	5	0.390
EL14SM1 14	5	0.440	5	1.040	5	5.700	5	23.400	5	0.270	5	0.370
EL14SM3 15	5	1.580	5	0.780	5	10.220	5	7.070	5	0.250	5	0.710
EL14SM2 15	5	0.630	5	1.180	5	6.570	5	10.800	5	0.449	5	0.237
EL28SM3 28	5	1.540	5	0.720	5	13.470	5	12.770	5	0.220	5	0.300
EL28SM2 28	5	2.150	5	2.490	5	19.300	5	******	5	0.334	5	0.141
EL28SM1 28	5	1.430	5	1.320	5	15.000	5	10.830	5	0.240	5	0.360
EL56SM3 56	5	1.380	5	1.130	5	5.830	5	6.900	5	0.434	5	0.832
EL56SM2 56	5	1.993	5	0.440	5	12.450	5	5.151	5	0.817	5	0.477
EL56SM1 61	5	0.710	5	3.180	5	6.020	5	19.720	5	0.090	5	0.420
WATER 100.0% 50°C												
EH01WP1 1	5	1.850	5	0.980	5	13.800	5	13.020	5	0.415	5	0.400
EH07WP1 7	5	2.400	5	1.260	5	27.000	5	14.600	5	0.330	5	0.261
EH14WP1 14	7	1.410	6	3.000	7	14.100	6	30.900	6	0.140	5	0.180
EH28WP1 28	5	1.070	5	1.660	5	8.680	5	27.090	5	0.244	5	0.220
EH56WP1 56	5	1.040	5	1.660	5	10.620	5	18.070	5	0.390	5	0.330
WATER 100.0% 23°C												
EL01WP1 1	5	1.040	5	12.980	5	2.290	5	19.290	5	0.460	5	0.660
EL01WP2 1	6	1.730	5	1.640	6	9.250	5	9.460	5	0.297	5	0.460
EL01WP3 1	5	2.220	5	1.040	5	8.490	5	66.780	5	0.520	5	0.300
EL07WP1 7	5	1.540	5	1.390	5	20.600	5	7.900	5	0.300	5	0.360

ETHYLENE PROPYLENE DIENE MONOMER: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
WATER 100.0% 23°C												
EL07WP3 7	5	2.370	5	1.450	5	25.200	5	14.900	5	0.228	5	0.240
EL07WP2 7	5	1.820	5	1.870	5	16.500	1	11.200	5	0.220	5	0.550
EL14WP3 14	5	1.450	5	2.590	5	13.770	5	19.890	5	0.430	5	0.456
EL14WP1 14	5	1.200	5	1.900	5	21.000	5	20.000	5	0.130	5	0.200
EL14WP2 14	5	1.540	5	1.450	5	14.260	5	*	5	0.390	5	0.680
EL28WP2 28	5	1.750	5	1.560	5	17.300	5	11.100	5	0.370	5	0.300
EL28WP3 28	5	1.040	5	0.911	5	11.500	5	5.700	5	0.167	5	0.390
EL28WP1 28	5	0.910	5	2.370	5	11.990	5	19.630	5	0.520	5	0.170
EL56WP1 56	5	1.340	5	1.660	5	22.110	5	29.530	5	0.370	5	0.400
EL56WP2 56	5	4.800	5	2.160	5	25.950	5	9.700	5	0.780	5	0.490
EL56WP3 56	5	2.360	5	1.580	5	12.590	5	9.000	5	0.590	5	1.020
POTASSIUM DICHROMATE 10.0% 50°C												
EH01XM1 1	5	2.714	5	1.210	5	26.863	5	16.250	5	0.184	5	0.065
EH07XM1 7	5	6.111	5	8.709	5	26.658	5	4.438	5	0.212	5	0.089
EH14XM1 14	5	0.359	5	2.254	5	9.394	5	12.208	5	0.485	5	0.419
EH28XM1 28	5	2.371	5	1.385	5	20.809	5	18.004	5	0.333	5	0.362
EH56XM1 56	5	1.599	5	2.523	5	23.146	5	26.436	5	0.075	5	0.221
POTASSIUM DICHROMATE 10.0% 23°C												
EL01XM3 1	5	1.350	5	3.297	5	5.725	5	19.307	5	0.468	5	0.384
EL01XM2 1	5	4.453	5	1.952	5	46.663	5	8.201	5	0.393	5	0.168
EL01XM1 1	5	3.730	5	1.540	5	28.117	5	85.812	5	0.184	5	0.130
EL07XM3 7	5	2.103	5	1.802	5	12.963	5	19.968	5	0.430	5	0.305
EL07XM1 7	5	7.397	5	6.931	5	10.334	5	18.201	5	0.821	5	0.092
EL07XM2 7	5	4.330	5	4.564	5	17.860	5	26.171	5	0.313	5	0.305
EL14XM1 14	5	3.752	5	1.069	5	28.968	5	7.227	5	0.486	5	0.603
EL14XM3 14	5	3.996	5	6.124	5	15.224	5	31.141	5	0.121	5	0.234
EL14XM2 14	5	4.716	5	7.783	5	8.661	5	11.561	5	0.236	5	0.443
EL28XM2 28	5	4.124	4	1.888	5	30.853	4	21.086	5	0.104	5	0.152
EL28XM1 28	5	2.281	5	2.051	5	17.881	5	15.393	5	0.420	5	0.193
EL28XM3 28	5	1.806	4	1.274	5	42.674	4	9.404	5	0.109	5	0.349
EL56XM3 56	5	1.559	5	3.204	5	13.314	5	25.272	5	0.180	5	0.252
EL56XM2 56	5	1.992	5	2.413	5	24.178	5	22.213	5	0.249	5	0.117
EL56XM1 56	5	2.217	5	0.633	5	64.423	5	6.924	5	0.072	5	0.079

EPDM : RETENTION OF PROPERTIES

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
HYDROCHLORIC ACID 10.0% 50°C										
EH01AM1	1	1.8	1.4	1.8	132	140	124	113	105	111
EH07AM1	7	4.9	3.3	6.2	114	118	110	106	102	103
EH14AM1	14	6.7	3.7	6.8	111	104	105	100	84	88
EH28AM1	27	8.3	5.4	9.0	101	106	91	95	90	96
EH99AM1	28	12.1	7.2	14.4	*	*	*	*	*	*
EH56AM1	56	16.1	9.1	19.3	90	94	85	80	85	101
EH99AM2	144	48.8	18.4	53.3	*	*	*	*	*	*
EH99AM3	252	79.3	24.7	90.1	*	*	*	*	*	*
EH99AM4	368	93.3	27.9	100.9	*	*	*	*	*	*
EH99AM5	511	112.5	31.6	122.9	*	*	*	*	*	*
EH99AM6	621	118.3	32.8	132.8	*	*	*	*	*	*
EH99AM7	741	106.0	32.1	118.9	50	*	29	*	*	*
HYDROCHLORIC ACID 10.0% 23°C										
EL01AM2	1	2.4	.5	.4	87	92	113	107	71	82
EL01AM1	1	.7	.3	.3	*	*	108	95	*	*
EL01AM3	1	.6	1.2	1.5	137	107	109	110	108	101
EL07AM1	7	1.0	.4	.3	79	88	119	100	74	73
EL07AM3	7	1.9	.3	.3	97	131	112	108	104	120
EL07AM2	7	1.2	.4	.6	97	80	110	108	93	77
EL14AM3	14	1.8	.6	1.2	120	151	102	109	121	138
EL14AM1	14	1.4	.3	.3	152	153	120	113	143	144
EL14AM2	14	1.1	*	.9	130	133	104	107	129	126
EL28AM1	27	1.1	.7	.3	*	*	110	110	*	*
EL28AM2	27	1.3	.9	.6	*	*	108	113	*	*
EL28AM3	27	1.6	*	.7	*	*	106	115	*	*
EL99AM1	28	.7	*	.5	*	*	*	*	*	*
EL56AM2	56	1.9	1.9	3.0	105	96	109	102	101	82
EL56AM1	56	1.6	1.2	3.1	88	93	108	98	94	92
EL56AM3	56	2.5	1.9	3.2	100	106	107	106	106	96
EL99AM2	144	2.1	.5	1.6	*	*	*	*	*	*
EL99AM3	238	2.1	.5	1.9	*	*	*	*	*	*
EL99AM4	368	2.9	.9	2.2	*	*	*	*	*	*
EL99AM5	511	4.6	1.6	3.6	*	*	*	*	*	*
EL99AM6	621	4.3	1.4	4.2	*	*	*	*	*	*
EL99AM7	736	5.0	2.5	5.5	98	*	91	*	*	*
SODIUM HYDROXIDE 10.0% 50°C										
EH01BM1	1	.3	.4	.7	106	101	108	111	85	83
EH07BM1	7	.3	.3	*	109	108	115	108	90	86
EH14BM1	14	.7	*	.1	98	106	105	106	94	106
EH28BM1	28	.1	.3	.6	107	102	107	101	88	80
EH99BM1	29	.6	.2	.3	*	*	*	*	*	*
EH56BM1	56	1.4	*	.4	114	119	111	108	82	93

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
SODIUM HYDROXIDE 10.0% 50°C									
EH99BM2 144	.4	.5	.9	*	*	*	*	*	*
EH99BM3 252	.5	.2	.4	*	*	*	*	*	*
EH99BM4 368	.9	.2	.7	*	*	*	*	*	*
EH99BM5 510	.7	.2	.9	*	*	*	*	*	*
EH99BM6 622	.4	.2	*	*	*	*	*	*	*
EH99BM7 741	2.7	1.4	1.2	117	*	95	*	*	*
SODIUM HYDROXIDE 10.0% 23°C									
EL01BM3 1	.2	*	*	96	105	107	104	89	84
EL01BM1 1	.1	.7	.5	111	102	108	107	88	77
EL01BM2 1	.2	.5	.7	95	109	101	108	94	88
EL07BM3 7	.4	*	.1	99	105	114	115	86	85
EL07BM2 7	.2	.8	1.1	103	105	114	104	90	81
EL07BM1 7	*	*	.6	107	111	112	108	88	91
EL14BM2 14	.4	.9	1.0	96	101	110	102	90	83
EL14BM1 14	.3	.5	.2	105	111	110	108	80	100
EL14BM3 14	1.0	.2	.3	97	102	109	113	81	81
EL28BM2 28	.2	.6	.7	105	111	120	103	89	87
EL99BM1 28	.9	.2	.2	*	*	*	*	*	*
EL28BM1 28	.4	.3	*	110	136	110	97	81	102
EL28BM3 28	.4	*	*	103	111	113	108	91	99
EL56BM3 56	.8	.3	.6	96	100	124	112	81	75
EL56BM1 56	.6	.3	.5	100	116	124	110	91	94
EL56BM2 56	.3	.2	.1	96	109	118	*	94	94
EL99BM2 144	.6	.7	.6	*	*	*	*	*	*
EL99BM3 238	.2	.7	*	*	*	*	*	*	*
EL99BM4 368	.2	.7	.5	*	*	*	*	*	*
EL99BM5 510	.4	.7	.6	*	*	*	*	*	*
EL99BM6 622	.2	.9	.8	*	*	*	*	*	*
EL99BM7 736	*	.5	.3	102	*	95	*	*	*
1 2 DICHLOROETHANE .8% 50°C									
EH01DH1 1	8.3	2.0	5.7	92	97	102	98	89	84
EH07DH1 7	8.2	1.8	5.0	90	94	109	104	84	78
EH14DH1 14	10.0	2.3	5.8	89	92	118	117	84	72
EH99DH1 28	6.1	3.8	6.6	*	*	*	*	*	*
EH28DH1 28	9.7	2.4	6.7	95	93	107	103	75	77
EH56DH1 56	7.5	2.1	6.1	91	97	109	109	97	80
EH99DH2 133	5.6	3.1	5.7	*	*	*	*	*	*
EH99DH3 244	12.9	4.5	8.9	*	*	*	*	*	*
EH99DH4 364	10.7	4.9	12.1	*	*	*	*	*	*
EH99DH5 495	10.5	5.6	11.8	*	*	*	*	*	*
EH99DH6 629	12.5	6.3	12.7	*	*	*	*	*	*
EH99DH7 734	9.9	6.1	12.8	88	*	100	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			1 2 DICHLOROETHANE	.8%	23°C				
EL01DH3 1	5.3	.5	2.0	94	99	103	96	88	85
EL01DH2 1	4.7	.3	1.4	99	98	114	100	84	86
EL01DH1 1	7.1	.9	3.1	95	94	106	97	91	76
EL07DH1 7	6.5	1.6	3.8	93	93	115	104	86	80
EL07DH2 7	5.3	.7	2.2	91	98	115	109	83	77
EL07DH3 7	4.3	.8	2.2	91	*	123	*	93	82
EL14DH2 14	7.2	1.5	4.5	93	98	108	103	77	75
EL14DH1 14	9.0	1.8	5.6	90	91	*	*	80	75
EL14DH3 14	8.9	2.3	5.1	94	94	110	108	82	72
EL28DH1 28	9.4	3.2	7.5	91	94	107	99	75	74
EL28DH2 28	7.4	2.4	5.4	91	94	106	101	85	74
EL28DH3 28	6.0	2.2	5.1	90	98	103	97	98	68
EL99DH1 28	3.0	.2	5.1	*	*	*	*	*	*
EL56DH1 56	4.4	1.2	3.5	86	98	98	103	93	82
EL56DH2 56	7.4	1.6	4.6	91	93	108	100	80	76
EL56DH3 56	7.9	2.1	5.0	90	90	107	101	73	84
EL99DH2 134	6.4	1.0	3.2	*	*	*	*	*	*
EL99DH3 231	4.6	2.0	6.5	*	*	*	*	*	*
EL99DH4 364	5.0	6.2	3.6	*	*	*	*	*	*
EL99DH5 495	4.7	.7	2.9	*	*	*	*	*	*
EL99DH6 630	6.5	9.5	12.2	*	*	*	*	*	*
EL99DH7 729	7.1	2.5	6.5	115	*	91	*	*	*
			1 2 DICHLOROETHANE	.1%	50°C				
EH01DL1 1	1.1	*	.6	94	98	104	98	88	86
EH07DL1 7	2.2	.3	1.0	95	95	107	101	80	83
EH14DL1 14	3.1	*	.7	93	94	*	*	80	85
EH28DL1 28	3.1	.8	1.2	98	94	107	99	77	76
EH99DL1 28	2.2	2.0	2.8	*	*	*	*	*	*
EH56DL1 56	2.5	.8	1.5	89	90	103	97	93	83
EH99DL2 139	3.5	1.1	2.3	*	*	*	*	*	*
EH99DL3 246	5.2	2.3	4.8	*	*	*	*	*	*
EH99DL4 366	5.4	1.8	4.6	*	*	*	*	*	*
EH99DL5 496	5.5	2.5	6.0	*	*	*	*	*	*
EH99DL6 631	5.9	3.2	5.3	*	*	*	*	*	*
EH99DL7 736	5.5	2.7	5.8	107	*	96	*	*	*
			1 2 DICHLOROETHANE	.1%	23°C				
EL01DL3 1	1.1	*	.5	94	98	106	100	91	80
EL01DL2 1	1.3	.3	.4	99	100	106	101	89	81
EL01DL1 1	.9	.5	.3	96	98	102	100	93	84
EL07DL1 7	1.4	.6	.7	94	93	108	100	85	81
EL07DL2 7	1.7	.8	.7	92	98	107	102	87	81
EL07DL3 7	1.7	*	*	92	95	108	111	88	82

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
1 2 DICHLOROETHANE .1% 23°C									
EL14DL1 14	1.7	.3	.5	95	96	*	*	90	80
EL14DL2 14	1.8	.2	.4	92	96	112	106	87	79
EL14DL3 14	1.4	*	.3	98	94	121	104	84	97
EL28DL1 28	1.7	.3	*	96	95	108	101	78	79
EL28DL3 28	1.7	.5	.8	96	98	103	98	90	86
EL99DL1 28	1.1	1.1	.8	*	*	*	*	*	*
EL28DL2 28	1.5	.5	.5	95	96	102	101	87	82
EL56DL2 56	2.0	.6	1.0	86	90	107	110	82	80
EL56DL3 56	1.6	.6	1.0	95	96	107	99	86	79
EL56DL1 56	1.4	.3	.5	91	97	105	102	90	85
EL99DL2 136	2.0	.9	.2	*	*	*	*	*	*
EL99DL3 233	1.7	.4	1.2	*	*	*	*	*	*
EL99DL4 366	1.7	.7	.3	*	*	*	*	*	*
EL99DL5 496	2.0	.4	.2	*	*	*	*	*	*
EL99DL6 632	2.5	.7	.3	*	*	*	*	*	*
EL99DL7 731	1.6	.2	1.4	100	*	108	*	*	*
1 2 DICHLOROETHANE .5% 50°C									
EH01DM1 1	4.7	.9	2.6	96	98	108	103	88	83
EH07DM1 7	3.9	.8	2.0	89	94	110	108	87	73
EH14DM1 14	5.5	1.2	1.8	95	93	122	*	72	88
EH28DM1 28	6.8	1.7	4.5	92	95	110	105	87	72
EH99DM1 28	4.7	1.2	2.9	*	*	*	*	*	*
EH56DM1 56	4.2	2.0	3.1	96	94	108	99	88	87
EH99DM3 245	9.5	2.8	7.2	*	*	*	*	*	*
EH99DM4 365	7.9	3.0	7.5	*	*	*	*	*	*
EH99DM5 496	8.4	2.8	7.3	*	*	*	*	*	*
EH99DM6 630	9.8	3.9	8.9	*	*	*	*	*	*
EH99DM7 735	9.9	3.7	9.4	97	*	88	*	*	*
1 2 DICHLOROETHANE .5% 23°C									
EL01DM3 1	3.9	.8	2.1	94	98	117	112	95	83
EL01DM2 1	4.2	.3	1.5	96	98	111	103	94	85
EL01DM1 1	5.9	1.5	3.8	92	90	102	95	86	87
EL07DM2 7	4.0	.3	1.2	88	91	103	102	83	80
EL07DM3 7	3.2	2.5	3.7	90	97	102	100	85	78
EL07DM1 7	4.5	.5	2.6	90	89	103	98	84	83
EL14DM3 14	4.9	.6	1.6	95	99	107	101	83	78
EL14DM2 14	4.9	1.3	2.7	92	100	107	102	85	75
EL14DM1 14	4.7	1.0	1.6	92	99	*	*	86	73
EL28DM1 28	3.8	.7	2.5	87	91	105	108	84	71
EL99DM1 28	2.8	.5	1.3	*	*	*	*	*	*
EL28DM2 28	4.0	.2	.9	92	94	105	99	88	86
EL28DM3 28	3.3	1.2	1.8	92	95	107	101	88	83
EL56DM3 56	3.7	1.5	2.2	93	95	104	99	82	76

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			1 2 DICHLOROETHANE .5% 23°C						
EL56DM2 56	3.1	1.6	2.4	94	98	103	100	81	80
EL56DM1 56	4.0	1.5	2.8	93	95	100	97	85	81
EL99DM2 135	3.4	.2	1.6	*	*	*	*	*	*
EL99DM3 233	2.5	.5	2.2	*	*	*	*	*	*
EL99DM4 365	2.2	.2	2.5	*	*	*	*	*	*
EL99DM5 496	2.5	.7	1.9	*	*	*	*	*	*
EL99DM6 631	3.5	.7	1.8	*	*	*	*	*	*
EL99DM7 730	5.3	.9	3.1	102	*	108	*	*	*
			FURFURAL 8.0% 50°C						
EH01FH1 1	.8	.2	.8	97	98	111	100	128	121
EH07FH1 7	3.6	1.0	2.6	95	106	126	122	109	92
EH14FH1 14	3.6	1.3	3.5	91	93	116	115	81	92
EH28FH1 28	5.4	2.1	4.4	96	94	114	106	84	90
EH99FH1 28	1.8		2.5	*	*		*	*	*
EH56FH1 56	5.0	3.2	5.2	93	99	115	120	84	83
EH99FH2 117	14.7	10.0	21.6	*	*	*	*	*	*
EH99FH3 236	45.7	21.9	55.7	*	*	*	*	*	*
EH99FH4 350	61.8	28.8	80.4	*	*	*	*	*	*
EH99FH5 485	68.5	28.5	111.0	*	*	*	*	*	*
EH99FH6 616	82.7	33.9	102.1	*	*	*	*	*	*
EH99FH7 721	90.9	38.2	112.3	71	*	42	*	*	*
			FURFURAL 8.0% 23°C						
EL01FH3 1	*	1.0	1.8	96	95	111	103	110	127
EL01FH2 1	.1	.5	.8	94	99	114	108	112	124
EL01FH1 1	.3	.3	.1	95	100	111	105	120	153
EL07FH2 7	1.7	.3	1.0	95	98	121	106	100	97
EL07FH3 7	1.9	.5	1.4	93	95	113	111	104	108
EL07FH1 7	2.0	.8	2.0	94	99	116	114	101	105
EL14FH1 14	2.4	.2	.9	91	96	117	116	86	82
EL14FH3 14	2.4	.5	1.7	90	99	110	110	91	76
EL14FH2 14	2.3	.5	1.8	91	98	118	117	81	83
EL28FH1 28	3.0	.9	2.2	94	101	120	112	92	84
EL28FH3 28	2.8	1.3	3.3	91	97	117	114	88	79
EL99FH1 28	6.5	.8	1.7	*	*	*	*	*	*
EL28FH2 28	2.9	.3	2.9	97	96	116	116	83	80
EL56FH1 56	3.3	*	.8	93	98	118	112	90	79
EL56FH2 56	3.4	1.2	2.5	95	98	116	117	82	86
EL56FH3 56	3.5	1.8	3.2	95	94	125	111	95	86
EL99FH2 117	9.8	2.2	5.4	*	*	*	*	*	*
EL99FH3 219	18.2	7.1	17.0	*	*	*	*	*	*
EL99FH4 350	32.2	11.0	30.0	*	*	*	*	*	*
EL99FH5 485	27.7	10.7	25.1	*	*	*	*	*	*
EL99FH6 617	41.2	15.1	38.0	*	*	*	*	*	*
EL99FH7 716	48.3	17.6	45.4	85	*	66	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
FURFURAL 1.0% 50°C									
EH01FL1 1	.7	.5	.5	98	99	113	104	125	98
EH07FL1 7	1.4	.8	1.5	99	97	128	116	100	107
EH14FL1 14	1.6	.7	1.3	96	94	117	113	86	101
EH28FL1 28	1.9	1.3	2.0	95	99	118	117	88	88
EH99FL1 28	1.6	1.1	1.8	*	*	*	*	*	*
EH56FL1 56	3.2	1.5	2.4	96	96	118	110	93	80
EH99FL2 123	3.4	.8	2.9	*	*	*	*	*	*
EH99FL3 241	11.4	5.5	11.9	*	*	*	*	*	*
EH99FL4 355	11.4	5.8	13.1	*	*	*	*	*	*
EH99FL5 489	13.7	4.7	13.7	*	*	*	*	*	*
EH99FL6 621	16.3	7.4	17.0	*	*	*	*	*	*
EH99FL7 726	16.7	8.0	18.3	103	*	82	*	*	*
FURFURAL 1.0% 23°C									
EL01FL2 1	.4	.3	.3	100	101	101	112	133	144
EL01FL3 1	.4	1.0	1.0	97	95	99	108	106	135
EL01FL1 1	.3	.5	.7	95	101	106	104	115	163
EL07FL2 7	.9	.2	.5	98	101	121	118	104	97
EL07FL3 7	1.2	*	*	95	101	118	115	100	108
EL07FL1 7	.9	.3	.1	96	101	128	110	109	95
EL14FL3 14	1.6	.3	.4	95	100	121	106	98	87
EL14FL2 14	1.0	.3	.1	97	97	120	115	88	94
EL14FL1 14	1.0	.2	.6	93	99	114	114	100	90
EL28FL2 28	1.5	.5	.5	96	97	113	107	80	85
EL28FL3 28	2.2	*	*	94	94	108	104	78	85
EL99FL1 28	.7	.7	1.0	*	*	*	*	*	*
EL28FL1 28	1.1	.3	.6	96	101	118	116	85	88
EL56FL3 56	1.3	.3	.6	91	99	102	109	94	87
EL56FL2 56	1.8	.3	.7	93	97	113	110	89	79
EL56FL1 56	1.5	.5	.5	95	98	121	112	92	84
EL99FL2 123	1.1	.5	1.2	*	*	*	*	*	*
EL99FL3 224	1.9	1.4	2.9	*	*	*	*	*	*
EL99FL4 355	2.1	1.1	2.8	*	*	*	*	*	*
EL99FL5 489	2.1	.7	1.1	*	*	*	*	*	*
EL99FL6 622	3.1	1.4	2.9	*	*	*	*	*	*
EL99FL7 721	2.7	.5	2.3	95	*	93	*	*	*
FURFURAL 4.0% 50°C									
EH01FM1 1	2.0	.5	1.7	97	96	115	105	115	145
EH07FM1 7	2.5	.8	1.5	97	97	127	115	105	97
EH14FM1 14	2.7	.5	1.4	93	95	118	114	97	97
EH28FM1 28	3.4	1.3	2.7	89	98	117	117	87	84
EH99FM1 29	1.9	1.3	2.7	*	*	*	*	*	*
EH56FM1 56	4.6	2.2	3.2	94	96	120	114	90	84

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
FURFURAL 4.0% 50°C									
EH99FM2 124	2.9	2.4	5.3	*	*	*	*	*	*
EH99FM3 242	9.8	5.1	10.9	*	*	*	*	*	*
EH99FM4 356	12.3	6.1	13.4	*	*	*	*	*	*
EH99FM5 490	14.8	1.3	7.7	*	*	*	*	*	*
EH99FM6 622	19.1	9.3	21.1	*	*	*	*	*	*
EH99FM7 727	21.1	28.8	44.5	102	*	79	*	*	*
FURFURAL 4.0% 23°C									
EL01FM1 1	.9	.3	20.0	94	96	111	102	110	133
EL01FM3 1	*	1.5	1.8	94	101	114	106	121	123
EL01FM2 1	*	1.5	1.9	94	97	112	103	113	118
EL07FM1 7	2.1	1.1	1.7	98	99	122	114	100	103
EL07FM2 7	1.8	*	1.2	99	101	118	114	103	107
EL07FM3 7	1.8	.5	1.0	95	100	115	113	103	98
EL14FM1 14	1.8	.7	1.1	94	93	121	113	93	105
EL14FM2 14	1.4	.5	1.3	93	97	112	115	83	93
EL14FM3 14	1.5	.2	.9	93	92	111	106	94	87
EL28FM1 28	2.9	.8	.6	92	93	117	113	88	83
EL28FM3 28	2.8	*	.3	95	94	120	113	83	80
EL28FM2 28	2.2	.3	1.1	94	96	116	107	86	82
EL99FM1 29	2.2	.2	.2	*	*	*	*	*	*
EL56FM1 56	3.4	.3	.7	95	97	117	107	87	81
EL56FM2 56	2.8	1.0	1.2	94	95	121	112	85	84
EL56FM3 56	2.6	.7	1.3	90	94	115	115	84	86
EL99FM2 124	2.9	.5	1.5	*	*	*	*	*	*
EL99FM3 228	3.3	1.1	3.2	*	*	*	*	*	*
EL99FM4 356	4.2	1.1	3.5	*	*	*	*	*	*
EL99FM5 490	4.9	1.4	3.3	*	*	*	*	*	*
EL99FM6 623	6.1	2.5	5.1	*	*	*	*	*	*
EL99FM7 722	6.4	2.7	6.5	99	*	101	*	*	*
METHYL ETHYL KETONE 26.0% 50°C									
EH01MH1 1	6.1	2.6	8.3	92	92	112	111	94	89
EH07MH1 7	9.2	4.2	10.4	88	94	106	102	108	103
EH14MH1 14	9.9	4.6	10.8	89	92	108	106	105	101
EH28MH1 28	9.0	5.3	12.3	95	99	108	108	95	94
EH99MH1 28	8.4	3.7	8.7	*	*	*	*	*	*
EH56MH1 57	11.5	6.1	14.2	96	98	109	104	97	86
EH99MH2 115	10.4	3.5	8.1	*	*	*	*	*	*
EH99MH3 240	10.3	4.9	9.9	*	*	*	*	*	*
EH99MH4 358	9.6	4.2	9.8	*	*	*	*	*	*
EH99MH5 494	6.9	2.8	5.3	*	*	*	*	*	*
EH99MH6 626	8.7	3.5	6.7	*	*	*	*	*	*
EH99MH7 730	12.0	5.3	11.0	74	*	95	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
METHYL ETHYL KETONE 26.0% 23°C									
EL01MH1 1	5.3	3.0	8.1	89	94	109	105	87	89
EL01MH3 1	4.8	1.5	7.0	89	92	111	108	96	89
EL01MH2 1	4.5	2.3	6.8	95	95	111	101	101	91
EL07MH2 7	5.9	2.1	6.4	92	96	111	104	118	111
EL07MH1 7	5.8	2.7	6.8	95	96	111	103	127	118
EL07MH3 7	6.1	3.1	7.9	92	95	112	105	116	111
EL14MH2 14	5.7	2.3	5.9	93	95	109	102	113	103
EL14MH1 14	5.1	1.3	4.7	92	96	108	105	118	108
EL14MH3 14	6.1	2.9	7.1	94	96	114	102	117	105
EL28MH3 28	6.2	2.6	7.0	93	97	111	104	103	92
EL99MH1 28	7.0	12.5	17.7	*	*	*	*	*	*
EL28MH2 28	6.4	3.0	7.9	94	97	109	105	100	97
EL28MH1 28	6.2	.5	5.3	93	95	111	104	99	95
EL56MH2 57	6.3	3.9	8.6	96	99	116	107	104	91
EL56MH1 57	7.1	3.3	8.5	95	97	116	109	103	95
EL56MH3 57	7.6	3.7	9.2	93	96	115	107	103	97
EL99MH2 121	8.6	11.6	16.5	*	*	*	*	*	*
EL99MH3 235	4.0	13.6	19.3	*	*	*	*	*	*
EL99MH4 358	7.4	31.8	37.7	*	*	*	*	*	*
EL99MH5 494	7.5	12.2	16.2	*	*	*	*	*	*
EL99MH6 627	8.8	10.8	12.0	*	*	*	*	*	*
EL99MH7 725	7.8	12.5	16.8	103	*	84	*	*	*
METHYL ETHYL KETONE 3.0% 50°C									
EH01ML1 1	1.2	.5	1.0	95	96	108	113	89	93
EH07ML1 7	3.1	*	.8	100	99	108	108	130	116
EH14ML1 14	3.6	1.3	2.6	98	102	115	111	128	116
EH28ML1 28	2.6	.5	1.6	94	99	112	111	101	98
EH99ML1 28	2.6	.9	1.8	*	*	*	*	*	*
EH56ML1 57	2.4	1.6	2.2	97	102	114	108	115	105
EH99ML2 120	5.3	.9	2.8	*	*	*	*	*	*
EH99ML3 240	5.9	1.8	4.7	*	*	*	*	*	*
EH99ML4 358	6.1	2.3	5.6	*	*	*	*	*	*
EH99ML5 494	6.4	1.8	4.6	*	*	*	*	*	*
EH99ML6 626	6.2	2.0	5.0	*	*	*	*	*	*
EH99ML7 730	5.8	2.3	5.0	101	*	93	*	*	*
METHYL ETHYL KETONE 3.0% 23°C									
EL01ML3 1	.6	.3	.4	87	97	99	100	100	95
EL01ML2 1	.8	1.4	1.6	99	97	112	101	91	101
EL01ML1 1	1.0	*	.1	96	101	113	103	100	90
EL07ML3 7	1.1	.3	.4	100	100	113	104	135	107
EL07ML1 7	.9	.2	.7	96	101	108	105	134	116
EL07ML2 7	1.1	*	.2	101	100	113	106	133	120
EL14ML1 14	.9	*	.5	97	100	112	108	129	127

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			METHYL ETHYL KETONE 3.0% 23°C						
EL14ML2 14	1.1	.5	.7	97	98	110	106	126	115
EL14ML3 14	1.1	.8	1.3	101	100	111	109	130	110
EL28ML3 28	1.4	.2	.4	93	100	111	106	108	97
EL28ML2 28	1.9	.3	.1	93	95	109	104	105	92
EL28ML1 28	1.2	*	.2	92	101	105	105	111	96
EL99ML1 28	1.0	*	.4	*	*	*	*	*	*
EL56ML1 57	1.3	.8	1.2	103	101	110	105	116	105
EL56ML2 57	.8	1.0	1.2	102	105	111	105	115	109
EL56ML3 57	5.7	.3	.5	99	99	109	103	114	105
EL99ML2 120	2.4	*	1.0	*	*	*	*	*	*
EL99ML3 235	1.7	.9	2.4	*	*	*	*	*	*
EL99ML4 358	2.1	.2	1.5	*	*	*	*	*	*
EL99ML5 494	1.7	.2	.9	*	*	*	*	*	*
EL99ML6 627	2.6	.5	1.3	*	*	*	*	*	*
EL99ML7 725	2.3	.9	2.3	100	*	103	*	*	*
			METHYL ETHYL KETONE 13.0% 50°C						
EH01MM1 1	4.1	2.3	5.9	93	93	108	100	94	93
EH07MM1 7	7.1	3.0	6.8	93	99	110	109	121	113
EH14MM1 14	4.5	2.5	5.2	96	98	113	102	117	100
EH99MM1 28	4.4	3.0	4.9	*	*	*	*	*	*
EH28MM1 28	7.6	5.1	10.4	95	97	110	104	101	89
EH56MM1 57	6.3	4.8	8.1	91	101	110	109	115	100
EH99MM2 120	8.4	3.4	7.1	*	*	*	*	*	*
EH99MM3 239	10.4	5.0	10.7	*	*	*	*	*	*
EH99MM4 357	9.8	4.4	10.0	*	*	*	*	*	*
EH99MM5 493	9.2	3.7	8.1	*	*	*	*	*	*
EH99MM6 625	9.2	4.1	8.2	*	*	*	*	*	*
EH99MM7 729	10.5	5.0	10.6	91	*	96	*	*	*
			METHYL ETHYL KETONE 13.0% 23°C						
EL01MM2 1	2.8	1.3	3.3	94	91	110	98	97	88
EL01MM3 1	2.5	.3	100.0	92	89	109	100	*	90
EL01MM1 1	2.3	.5	3.0	94	96	108	106	91	92
EL07MM2 7	3.5	.3	2.2	94	94	110	102	124	118
EL07MM3 7	3.6	1.3	3.3	*	*	*	*	126	115
EL07MM1 7	3.5	1.6	3.9	94	98	108	107	130	112
EL14MM1 14	3.4	1.0	2.6	92	94	109	101	125	115
EL14MM2 14	3.2	.8	2.4	95	96	113	105	134	115
EL14MM3 14	2.7	1.4	3.0	97	97	110	101	125	117
EL28MM2 28	3.0	1.1	3.1	90	98	113	105	101	93
EL28MM3 28	3.3	1.0	3.5	93	95	111	102	102	93
EL28MM1 28	2.8	1.0	3.1	98	101	115	108	105	95
EL99MM1 28	2.6	.3	1.4	*	*	*	*	*	*
EL56MM2 57	2.6	1.9	3.6	98	99	107	99	116	97

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
METHYL ETHYL KETONE 13.0% 23°C										
EL56MM3	57	1.8	1.4	2.1	98	98	113	109	119	106
EL56MM1	57	2.6	1.0	2.7	99	104	108	108	118	103
EL99MM2	120	3.9	.5	2.1	*	*	*	*	*	*
EL99MM3	234	3.1	1.6	5.4	*	*	*	*	*	*
EL99MM4	357	4.7	1.1	4.0	*	*	*	*	*	*
EL99MM5	493	5.2	1.1	3.7	*	*	*	*	*	*
EL99MM6	626	5.0	*	1.4	*	*	*	*	*	*
EL99MM7	724	5.4	2.2	5.3	90	*	80	*	*	*
ASTM #2 OIL 100.0% 50°C										
EH010M1	1	6.7	.3	3.5	111	115	109	104	96	108
EH070M1	7	1.3	1.1	1.7	100	104	109	104	102	110
EH140M1	14	1.5	.2	.8	94	99	106	105	83	89
EH990M1	28	15.9	10.0	21.2	*	*	*	*	*	*
EH280M1	28	2.1	*	1.2	100	97	113	106	80	82
EH560M1	56	5.1	.5	2.2	88	90	117	106	85	80
EH990M2	128	21.4	100.0	100.0	*	*	*	*	*	*
EH990M3	251	31.7	18.8	45.5	*	*	*	*	*	*
EH990M4	364	33.0	13.2	36.5	*	*	*	*	*	*
EH990M5	503	35.6	13.2	41.5	*	*	*	*	*	*
EH990M6	626	42.2	21.1	56.2	*	*	*	*	*	*
EH990M7	736	47.7	18.8	53.5	98	*	101	*	*	*
EL010M3	1	.7		.4	99	104	106	99	93	87
EL010M1	1	10.4	5.5	12.9	95	99	106	106	87	89
EL010M2	1	.6	.6	1.0	102	103	113	104	89	90
EL070M1	7	.7	.6	1.2	104	102	122	104	97	96
EL070M2	7	.6	.7	.5	98	99	110	101	103	94
EL070M3	7	1.4	.2	.4	101	103	114	108	101	95
EL140M2	14	.7	.4	.8	101	104	110	107	90	89
EL140M1	14	.6	.5	.9	100	102	112	106	87	93
EL140M3	14	1.8	.2	1.2	93	100	103	105	85	88
EL280M1	28	1.6	*	.6	93	98	103	101	83	83
EL280M2	28	.9	*	.4	99	102	108	104	94	89
EL280M3	28	1.5	.2	.3	97	97	108	99	87	84
EL990M1	28	7.9	1.8	5.2	*	*	*	*	*	*
EL560M2	56	1.5	.8	1.3	94	103	106	107	100	81
EL560M1	56	2.3	.7	1.4	105	121	107	109	104	90
EL560M3	56	1.6	1.1	1.8	94	106	107	107	97	84
EL990M2	128	14.5	4.3	11.4	*	*	*	*	*	*
EL990M3	237	14.5	2.2	7.8	*	*	*	*	*	*
EL990M4	364	16.0	2.2	10.4	*	*	*	*	*	*
EL990M5	503	27.8	6.5	18.5	*	*	*	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
ASTM #2 OIL 100.0% 23°C									
EL990M6 626	30.5	7.2	4.9	*	*	*	*	*	*
EL990M7 731	33.4	7.6	27.6	92	*	93	*	*	*
ASTM #2 OIL 100.0% 50°C									
EH010P1 1	34.0	13.1	38.5	81	77	86	88	67	82
EH070P1 7	79.3	64.0	148.7	65	62	70	68	45	39
EH140P1 14	82.5	29.2	97.4	57	57	69	62	45	41
EH280P1 28	81.9	28.4	95.1	62	62	70	69	59	58
EH990P1 28	65.9	26.0	83.9	*	*	*	*	*	*
EH560P1 56	86.4	29.2	99.9	62	61	70	67	58	58
EH990P2 141	80.9	28.8	99.5	*	*	*	*	*	*
EH990P3 257	88.8	29.7	103.0	*	*	*	*	*	*
EH990P4 385	86.3	28.8	102.5	*	*	*	*	*	*
EH990P5 509	89.1	29.9	105.9	*	*	*	*	*	*
EH990P6 627	90.1	29.7	107.4	*	*	*	*	*	*
EH990P7 742	91.4	30.6	109.1	71	*	69	*	*	*
ASTM #2 OIL 100.0% 23°C									
EL010P1 1	10.0	3.6	8.5	95	98	107	105	103	97
EL010P3 1	14.2	6.3	15.7	98	99	109	101	89	94
EL010P2 1	12.5	5.9	13.6	109	107	105	93	101	105
EL070P2 7	33.4	12.4	36.9	85	84	102	93	80	63
EL070P3 7	34.4	42.5	76.6	87	87	95	94	73	66
EL070P1 7	41.7	15.8	47.9	80	80	89	84	62	54
EL140P2 14	56.1	19.9	80.2	67	65	78	74	64	75
EL140P3 14	46.8	17.7	54.5	75	76	87	84	70	69
EL140P1 14	47.5	19.2	57.4	79	75	90	85	52	57
EL280P1 28	63.0	22.6	71.0	62	66	70	70	63	70
EL280P3 28	62.9	23.8	73.9	58	58	71	69	69	57
EL280P2 28	72.6	25.4	84.9	60	60	72	68	67	70
EL990P1 28	69.3	26.6	84.5	*	*	*	*	*	*
EL560P2 55	75.1	27.5	90.6	75	74	69	69	55	74
EL560P3 55	74.5	27.4	88.4	70	65	68	61	53	63
EL560P1 56	77.5	26.3	89.9	56	59	67	69	62	55
EL990P2 141	90.7	31.0	105.1	*	*	*	*	*	*
EL990P3 244	88.1	31.2	106.9	*	*	*	*	*	*
EL990P4 385	88.6	30.8	105.2	*	*	*	*	*	*
EL990P5 509	89.0	31.2	103.8	*	*	*	*	*	*
EL990P6 627	88.5	30.5	105.9	*	*	*	*	*	*
EL990P7 737	88.0	31.0	107.4	80	*	68	*	*	*
PHENOL 8.0% 50°C									
EH01PH1 1	1.9	.2	1.1	98	101	112	109	84	86
EH07PH1 7	2.1	*	.5	95	97	105	103	88	88

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			PHENOL 8.0% 50°C						
EH14PH1 14	4.1	1.4	4.6	95	94	127	129	90	87
EH28PH1 28	4.0	.7	1.5	94	102	118	116	95	82
EH99PH1 29	4.0	1.2	2.7	*	*	*	*	*	*
EH56PH1 56	4.8	1.8	3.7	94	97	117	115	79	80
EH99PH2 121	6.9	1.6	5.5	*	*	*	*	*	*
EH99PH3 243	9.9	3.3	9.6	*	*	*	*	*	*
EH99PH4 362	10.9	4.0	11.3	*	*	*	*	*	*
EH99PH5 499	13.5	5.4	14.0	*	*	*	*	*	*
EH99PH6 624	14.8	5.4	15.0	*	*	*	*	*	*
EH99PH7 728	16.0	6.1	16.6	87	*	99	*	*	*
			PHENOL 8.0% 23°C						
EL01PH1 1	1.5	.3	100.0	100	102	112	104	93	90
EL01PH2 1	1.5	.3	.5	96	98	115	104	88	84
EL01PH3 1	1.4	.3	.3	97	102	111	106	91	81
EL07PH1 7	1.6	.2	.3	94	98	107	104	91	83
EL07PH2 7	1.2	.2	.9	102	100	114	103	98	83
EL07PH3 7	2.0	1.2	2.4	99	103	113	108	98	90
EL14PH2 14	3.0	1.0	3.0	95	99	110	105	89	82
EL14PH1 14	1.9	.2	.3	89	91	117	111	88	80
EL14PH3 14	2.1	.7	2.2	94	98	111	107	88	83
EL28PH2 28	2.3	2.8	3.8	102	101	115	107	86	84
EL28PH3 28	2.7	.6	1.9	95	99	114	106	95	79
EL28PH1 28	2.6	.2	.9	95	97	112	109	73	93
EL99PH1 29	7.7	.2	1.5	*	*	*	*	*	*
EL56PH1 56	3.7	1.2	2.8	94	93	121	107	88	80
EL56PH2 56	3.6	.8	2.3	95	104	114	111	91	83
EL56PH3 56	3.6	1.3	2.8	92	100	119	110	89	84
EL99PH2 121	9.1	.2	2.2	*	*	*	*	*	*
EL99PH3 230	10.4	1.0	4.1	*	*	*	*	*	*
EL99PH4 362	11.3	1.2	4.7	*	*	*	*	*	*
EL99PH5 499	12.7	1.5	5.3	*	*	*	*	*	*
EL99PH6 625	14.2	2.0	6.6	*	*	*	*	*	*
EL99PH7 723	14.9	2.9	8.8	92	*	87	*	*	*
			PHENOL 1.0% 50°C						
EH01PL1 1	1.2	.2	.3	95	98	117	116	98	86
EH07PL1 7	1.1	.7	.7	100	97	117	106	92	95
EH14PL1 14	1.8	.4	.8	93	96	109	102	89	90
EH99PL1 28	2.2	1.1	2.0	*	*	*	*	*	*
EH28PL1 28	2.0	1.0	1.2	91	93	119	119	95	88
EH56PL1 56	2.4	1.4	1.8	100	104	123	115	95	86
EH99PL2 122	3.7	1.1	2.9	*	*	*	*	*	*
EH99PL3 245	5.2	1.8	4.4	*	*	*	*	*	*
EH99PL4 363	5.5	1.8	5.1	*	*	*	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			PHENOL	1.0%	50°C				
EH99PL5 499	5.6	1.4	4.3	*	*	*	*	*	*
EH99PL6 625	6.5	2.5	5.8	*	*	*	*	*	*
EH99PL7 729	6.1	3.2	6.6	96	*	91	*	*	*
			PHENOL	1.0%	23°C				
EL01PL2 1	1.0	*	.1	92	102	112	101	102	69
EL01PL3 1	1.1	.2	.1	98	100	109	103	92	80
EL01PL1 1	1.5	.5	.5	95	101	106	103	95	91
EL07PL2 7	.4	.2	.4	95	100	105	103	92	87
EL07PL1 7	.4	*	.2	98	102	114	111	104	83
EL07PL3 7	.4	.7	.4	98	99	108	107	97	89
EL14PL2 14	.7	*	.3	97	99	118	107	89	89
EL14PL3 14	1.3	*	.4	95	98	115	108	91	87
EL14PL1 14	1.8	.7	1.4	95	90	112	104	78	97
EL28PL1 28	1.2	.2	.3	91	98	117	115	97	89
EL28PL3 28	1.1	.3	34.0	98	102	112	105	92	88
EL28PL2 28	1.3	.2	.4	100	102	112	108	94	88
EL99PL1 28	2.2	1.6	.1	*	*	*	*	*	*
EL56PL3 56	1.5	.2	.1	97	102	109	106	90	90
EL56PL1 56	1.4	*	.5	95	101	114	107	96	85
EL56PL2 56	1.8	1.0	2.1	103	100	117	113	88	87
EL99PL2 122	3.4	.5	2.6	*	*	*	*	*	*
EL99PL3 233	3.2	1.1	3.7	*	*	*	*	*	*
EL99PL4 363	3.9	.7	3.6	*	*	*	*	*	*
EL99PL5 499	3.6	.7	3.4	*	*	*	*	*	*
EL99PL6 626	4.3	.7	3.4	*	*	*	*	*	*
EL99PL7 724	4.0	1.4	4.3	100	*	104	*	*	*
			PHENOL	4.0%	50°C				
EH01PM1 1	1.3	.2	.9	92	97	127	121	97	86
EH07PM1 7	1.4	.2	.5	94	97	105	102	96	90
EH14PM1 14	3.0	1.0	2.7	85	93	110	107	95	83
EH28PM1 28	3.0	.7	1.6	94	100	111	109	93	78
EH99PM1 29	3.1	.9	2.1	*	*	*	*	*	*
EH56PM1 56	3.6	1.6	2.5	95	107	119	118	88	73
EH99PM2 121	5.0	1.6	3.7	*	*	*	*	*	*
EH99PM3 244	7.7	3.8	8.5	*	*	*	*	*	*
EH99PM4 362	8.4	3.6	9.2	*	*	*	*	*	*
EH99PM5 499	10.5	4.2	10.4	*	*	*	*	*	*
EH99PM6 624	11.0	4.5	10.8	*	*	*	*	*	*
EH99PM7 728	11.5	4.7	11.5	91	*	91	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
PHENOL 4.0% 23°C									
EL01PM2 1	1.2	.3	.1	97	100	112	103	87	87
EL01PM1 1	1.2	.2	.6	93	94	123	118	91	96
EL01PM3 1	1.2	.3	.1	96	101	112	102	98	83
EL07PM2 7	.6	.2	.5	102	102	112	105	95	84
EL07PM1 7	1.1	.2	.6	96	99	118	111	105	78
EL07PM3 7	.5	.7	.3	96	99	110	101	100	88
EL14PM3 14	1.2	.9	.7	98	100	117	107	91	90
EL14PM2 14	1.2	.3	.4	97	103	109	110	95	85
EL14PM1 14	2.2	.7	1.7	92	93	113	113	92	81
EL28PM1 28	1.5	.7	43.9	91	94	112	109	99	77
EL28PM3 28	2.5	1.0	1.8	96	104	113	108	91	80
EL28PM2 28	1.6	*	.8	100	99	109	115	97	81
EL99PM1 29	1.9	1.4	1.8	*	*	*	*	*	*
EL56PM2 56	2.2	.8	1.6	102	100	116	107	88	82
EL56PM3 56	2.3	.2	.6	100	100	113	106	92	87
EL56PM1 56	1.9	.5	.9	98	105	110	106	90	81
EL99PM2 121	2.9	.5	1.4	*	*	*	*	*	*
EL99PM3 231	2.9	1.8	3.8	*	*	*	*	*	*
EL99PM4 362	3.5	3.4	5.7	*	*	*	*	*	*
EL99PM5 499	4.2	1.1	3.6	*	*	*	*	*	*
EL99PM6 625	4.8	1.6	4.1	*	*	*	*	*	*
EL99PM7 723	4.9	.9	3.9	86	*	83	*	*	*
SODIUM CHLORIDE 35.0% 50°C									
EH01SH1 1	.1	.6	.5	102	101	111	108	79	83
EH07SH1 7	.1	1.3	1.2	127	133	110	109	109	108
EH14SH1 14	.3	*	.1	91	97	103	96	99	90
EH28SH1 28	.4	*	*	101	122	97	113	86	92
EH56SH1 56	.6	.3	.1	109	101	117	110	90	93
EH99SH2 131	.7	.5	.1	*	*	*	*	*	*
EH99SH3 253	1.2	.2	.4	*	*	*	*	*	*
EH99SH4 379	1.7	*	.3	*	*	*	*	*	*
EH99SH5 510	3.1	1.1	.6	*	*	*	*	*	*
EH99SH1 630	2.1	.9	.7	*	*	*	*	*	*
EH99SH6 630	.3	.5	*	*	*	*	*	*	*
EH99SH7 742	*	.2	.4	109	*	98	*	*	*
SODIUM CHLORIDE 35.0% 23°C									
EL01SH1 1	.1	.4	.1	96	100	108	100	86	90
EL01SH2 1	.1	.4	.6	99	102	107	102	86	84
EL01SH3 1	.1	.2	.2	102	102	113	104	83	90
EL07SH2 7	.1	.5	.3	98	102	115	113	93	80
EL07SH1 7	100.0	.4	.4	96	103	108	105	86	84
EL07SH3 7	.1	.5	.7	98	105	112	106	83	88
EL14SH3 14	.2	.7	.8	103	101	115	100	84	88

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
SODIUM CHLORIDE 35.0% 23°C									
EL14SH1 14	.2	*	.2	107	96	109	97	85	97
EL14SH2 14	.2	.2	.8	104	106	116	113	81	85
EL28SH2 28	.1	.5	.5	109	105	106	110	88	78
EL28SH3 28	*	.7	.7	106	109	116	112	88	86
EL99SH1 28	.8	.2	.4	*	*	*	*	*	*
EL28SH1 28	.3	.3	.5	109	110	102	114	82	97
EL56SH1 56	.5	*	.6	113	97	122	93	92	85
EL56SH3 56	.3	.7	.4	104	104	99	107	84	80
EL56SH2 56	.3	1.0	.8	105	103	103	103	77	84
EL99SH2 131	.9	.2	.2	*	*	*	*	*	*
EL99SH3 246	.9	.5	.2	*	*	*	*	*	*
EL99SH4 379	.8	.7	.4	*	*	*	*	*	*
EL99SH5 510	.8	1.1	.9	*	*	*	*	*	*
EL99SH6 630	.1	.7	.3	*	*	*	*	*	*
EL99SH7 737	.3	.9	.3	102	*	104	*	*	*
SODIUM CHLORIDE 10.0% 50°C									
EH01SM1 1	1.0	.5	.2	94	88	98	100	71	84
EH07SM1 7	.6	1.3	1.6	94	89	115	120	81	77
EH14SM1 14	.2	.5	.6	102	102	108	105	76	77
EH28SM1 28	5.4	.5	.3	101	89	112	103	84	75
EH99SM1 28	1.0	.7	.3	*	*	*	*	*	*
EH56SM1 61	.3	.5	.4	99	96	114	105	98	94
EH99SM2 132	1.2	*	.3	*	*	*	*	*	*
EH99SM3 254	1.0	*	.2	*	*	*	*	*	*
EH99SM4 370	.8	.2	.7	*	*	*	*	*	*
EH99SM5 511	1.4	*	.7	*	*	*	*	*	*
EH99SM6 624	.2	*	.8	*	*	*	*	*	*
EH99SM7 743	.5	.9	.5	105	*	92	*	*	*
SODIUM CHLORIDE 10.0% 23°C									
EL01SM2 1	.9	.3	.7	107	105	101	105	91	81
EL01SM3 1	.7	.3	.1	103	106	112	105	90	94
EL01SM1 1	.7	*	.2	109	105	107	105	95	93
EL07SM2 7	.6	.5	1.3	95	86	109	109	88	82
EL07SM3 7	.7	.8	1.0	93	87	101	111	90	81
EL07SM1 7	.6	.5	.4	84	96	110	108	84	79
EL14SM1 14	.3	*	.5	101	100	102	101	78	81
EL14SM3 15	.6	.3	.4	89	98	100	95	87	87
EL14SM2 15	.5	.8	1.2	92	103	98	104	95	93
EL99SM1 28	.1	.2	.2	*	*	*	*	*	*
EL28SM3 28	.3	.5	.6	103	93	100	100	78	84
EL28SM2 28	.1	.7	.8	100	103	106	121	82	75
EL28SM1 28	4.9	*	.1	98	92	112	108	85	83
EL56SM2 56	.5	.3	.1	102	112	106	105	90	103

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			SODIUM CHLORIDE 10.0% 23°C						
EL56SM3 56	.5	1.0	.2	102	105	110	101	82	89
EL56SM1 61	.5	.9	.4	95	99	108	107	86	80
EL99SM2 132	.2	.5	.9	*	*	*	*	*	*
EL99SM3 246	.2	.9	1.1	*	*	*	*	*	*
EL99SM4 370	.5	.7	1.0	*	*	*	*	*	*
EL99SM5 511	1.0	.7	1.0	*	*	*	*	*	*
EL99SM6 624	.2	.9	1.5	*	*	*	*	*	*
EL99SM7 738	.2	.7	1.0	100	*	100	*	*	*
			WATER 100.0% 50°C						
EH01WP1 1	.7	.3	.6	116	126	88	91	99	97
EH07WP1 7	1.2	.5	.7	92	102	109	103	87	85
EH14WP1 14	1.7	.5	.9	97	101	112	107	75	95
EH28WP1 28	3.9	3.8	4.2	103	102	110	103	90	83
EH99WP1 28	2.4	.9	1.5	*	*	*	*	*	*
EH56WP1 56	3.0	2.7	3.7	99	96	112	106	85	75
EH99WP2 133	3.5	1.2	2.3	*	*	*	*	*	*
EH99WP3 254	5.3	2.3	5.0	*	*	*	*	*	*
EH99WP4 370	5.3	2.8	5.7	*	*	*	*	*	*
EH99WP5 503	5.3	2.3	5.2	*	*	*	*	*	*
EH99WP6 622	5.7	2.5	5.5	*	*	*	*	*	*
EH99WP7 743	5.8	2.8	6.0	103	*	87	*	*	*
			WATER 100.0% 23°C						
EL01WP2 1	.4	.3	.1	123	115	109	106	97	96
EL01WP1 1	.4	.6	.8	125	122	106	102	103	98
EL01WP3 1	.5	.3	.1	118	114	109	108	94	87
EL07WP2 7	.7	1.0	.9	98	103	112	105	95	84
EL07WP1 7	.8	*	.2	97	95	109	103	85	89
EL07WP3 7	.7	.5	.2	99	94	106	100	92	69
EL14WP1 14	.8	.7	.7	84	86	107	102	88	67
EL14WP2 14	1.0	.2	.3	95	103	105	84	87	88
EL14WP3 14	.7	*	.1	101	104	109	100	88	87
EL28WP1 28	1.0	2.1	2.3	108	115	108	102	97	89
EL99WP1 28	.9	.5	.9	*	*	*	*	*	*
EL28WP2 28	1.2	.9	.9	120	113	106	106	114	106
EL28WP3 28	1.1	.6	*	119	118	113	105	115	97
EL56WP3 56	1.3	*	.9	98	97	107	99	89	86
EL56WP2 56	1.5	.2	1.5	90	90	113	104	89	88
EL56WP1 56	1.3	.2	.6	100	99	110	109	86	86
EL99WP2 132	1.8	*	.7	*	*	*	*	*	*
EL99WP3 246	.5	.7	4.8	*	*	*	*	*	*
EL99WP4 370	2.2	.7	1.6	*	*	*	*	*	*
EL99WP5 503	1.9	*	1.0	*	*	*	*	*	*
EL99WP6 622	2.0	.9	1.8	*	*	*	*	*	*
EL99WP7 738	2.0	1.4	2.7	96	*	92	*	*	*

ETHYLENE PROPYLENE DIENE MONOMER: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
				POTASSIUM DICHROMATE 10.0% 50°C						
EH01XM1	1	.2	*	.1	107	88	117	109	84	95
EH07XM1	7	.5	.2	.2	99	108	111	106	92	70
EH14XM1	14	.8	.2	.1	107	114	113	107	78	94
EH99XM1	28	1.0	.5	.7	*	*	*	*	*	*
EH28XM1	28	4.1	3.3	3.2	109	107	104	112	80	90
EH56XM1	56	1.2	*	.6	89	104	116	111	94	80
EH99XM2	118	.9	.5	.9	*	*	*	*	*	*
EH99XM3	231	2.5	.5	.8	*	*	*	*	*	*
EH99XM4	363	2.6	.2	.8	*	*	*	*	*	*
EH99XM5	489	2.9	.9	1.6	*	*	*	*	*	*
EH99XM6	609	2.8	1.4	1.8	*	*	*	*	*	*
EH99XM7	720	3.0	.5	1.0	107	*	89	*	*	*
				POTASSIUM DICHROMATE 10.0% 23°C						
EL01XM2	1	.2	.3	.4	99	106	109	112	84	79
EL01XM1	1	*	*	*	110	93	119	98	92	74
EL01XM3	1	.3	*	.4	103	102	114	107	83	78
EL07XM3	7	.3	.2	.4	108	107	115	105	82	91
EL07XM1	7	.3	.6	.9	99	102	110	110	86	68
EL07XM2	7	.4	.3	.1	103	107	113	104	84	89
EL14XM3	14	.2	.9	.9	114	102	113	114	76	91
EL14XM1	14	.7	.5	.6	104	108	107	109	90	98
EL14XM2	14	.4	*	.1	112	109	115	120	72	92
EL28XM2	28	.4	.3	.2	108	103	121	122	85	90
EL28XM3	28	.6	.2	.3	100	102	117	122	89	81
EL99XM1	28	1.1	.5	.5	*	*	*	*	*	*
EL28XM1	28	.7	*	.2	114	113	108	112	84	87
EL56XM3	56	100.0	*	.3	96	91	115	109	90	87
EL56XM2	56	100.0	.6	.7	92	104	114	107	88	78
EL56XM1	56	.7	*	.4	100	88	111	111	74	83
EL99XM2	118	.9	.8	.5	*	*	*	*	*	*
EL99XM3	223	.5	.5	.1	*	*	*	*	*	*
EL99XM4	363	.8	.5	.3	*	*	*	*	*	*
EL99XM5	489	.6	.5	.4	*	*	*	*	*	*
EL99XM6	609	.6	.5	.3	*	*	*	*	*	*
EL99XM7	715	.5	.3	.1	101	*	102	*	*	*

EPI_CO :   FINAL PROPERTIES

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				HYDROCHLORIC ACID 10.0% 50°C						
LH01AM1 1	4.50	61.50	3.02	1.01	86.48	93.68	396.24	405.28	15.94	17.06
LH07AM1 7	4.45	61.40	3.03	1.01	90.04	103.37	430.24	427.76	15.07	15.02
LH14AM1 14	4.58	63.00	3.05	1.02	99.76	102.48	414.24	398.16	13.82	15.40
LH28AM1 27	4.53	62.70	3.10	1.03	94.73	105.24	427.68	418.40	14.25	15.88
LH99AM1 39	4.56	62.00	3.06	1.03	*	*	*	*	*	*
LH56AM1 56	4.90	66.80	3.11	1.03	91.74	113.54	344.16	318.16	13.70	14.94
LH99AM2 121	4.87	65.40	3.13	1.08	*	*	*	*	*	*
LH99AM3 241	5.22	68.00	3.20	1.08	*	*	*	*	*	*
LH99AM4 374	5.32	68.40	3.23	1.08	*	*	*	*	*	*
LH99AM5 484	5.53	70.00	3.27	1.10	*	*	*	*	*	*
LH99AM6 609	5.62	70.40	3.29	1.11	73.00	*	476.00	*	*	*
				HYDROCHLORIC ACID 10.0% 23°C						
LL01AM1 1	4.32	60.10	3.01	0.99	84.72	92.24	426.72	402.88	14.98	16.62
LL07AM1 7	4.46	61.60	3.01	1.00	87.86	98.04	417.04	405.60	16.06	17.21
LL14AM1 14	4.30	59.30	3.01	1.00	92.88	94.32	422.08	392.64	13.90	16.90
LL28AM1 27	4.24	58.90	3.02	1.00	92.50	97.66	428.16	413.04	16.05	17.57
LL99AM1 39	4.26	59.10	3.01	1.01	*	*	*	*	*	*
LL56AM1 56	4.62	64.20	3.04	1.01	97.11	105.26	310.56	316.64	15.08	15.66
LL99AM2 101	4.28	59.50	3.02	1.01	*	*	*	*	*	*
LL99AM3 241	4.29	59.40	3.02	1.01	*	*	*	*	*	*
LL99AM4 374	4.32	59.40	3.02	1.00	*	*	*	*	*	*
LL99AM5 484	4.32	59.30	3.02	1.01	*	*	*	*	*	*
LL99AM6 606	4.36	59.70	3.03	1.01	85.87	*	860.70	*	*	*
				SODIUM HYDROXIDE 10.0% 50°C						
LH01BM1 1	4.27	57.90	3.01	1.00	93.26	95.90	453.04	409.30	14.27	15.34
LH07BM1 7	4.39	60.20	3.01	1.00	92.74	97.46	343.68	378.88	14.91	16.53
LH14BM1 14	4.22	57.90	3.00	1.00	93.05	92.21	370.96	346.50	13.57	13.99
LH28BM1 28	4.34	59.70	3.00	1.00	93.35	99.70	295.28	266.16	12.16	12.63
LH99BM1 38	4.35	61.70	3.01	1.00	*	*	*	*	*	*
LH56BM1 56	4.72	65.70	3.01	1.01	95.06	99.94	283.60	319.76	11.92	14.03
LH99BM2 121	4.43	62.70	3.01	1.00	*	*	*	*	*	*
LH99BM3 241	4.47	61.60	3.00	1.00	*	*	*	*	*	*
LH99BM4 373	4.38	62.10	2.99	1.00	*	*	*	*	*	*
LH99BM5 485	4.35	61.90	2.99	1.00	*	*	*	*	*	*
LH99BM6 609	4.44	62.30	2.99	1.00	107.40	*	364.00	*	*	*
				SODIUM HYDROXIDE 10.0% 23°C						
LL01BM1 1	4.24	58.10	3.01	1.00	86.62	93.43	418.00	410.30	13.74	15.44
LL07BM1 7	4.36	59.20	3.00	1.00	90.97	94.70	454.96	429.60	14.98	15.97
LL14BM1 14	4.26	58.10	3.01	1.00	87.83	94.71	434.88	404.56	14.48	16.78

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM HYDROXIDE 10.0% 23°C										
LL28BM1 28	4.56	63.00	3.01	1.00	90.79	96.50	304.32	426.96	15.52	16.37
LL99BM1 38	4.25	58.70	3.02	1.00	*	*	*	*	*	*
LL56BM1 56	4.65	63.90	3.05	1.00	94.50	92.62	444.08	476.80	14.73	16.58
LL99BM2 101	4.25	58.60	3.02	1.01	*	*	*	*	*	*
LL99BM3 241	4.34	58.80	3.02	1.00	*	*	*	*	*	*
LL99BM4 373	4.27	59.20	3.02	1.00	*	*	*	*	*	*
LL99BM5 485	4.25	58.60	3.01	1.00	*	*	*	*	*	*
LL99BM6 606	4.26	58.70	3.02	1.00	83.83	*	623.17	*	*	*
1 2 DICHLOROETHANE .8% 50°C										
LH01DH1 1	4.93	65.50	3.07	1.02	80.60	84.70	373.06	324.26	14.04	13.75
LH07DH1 7	5.33	66.20	3.23	1.05	80.96	77.20	365.12	372.10	13.44	11.81
LH14DH1 14	5.29	67.20	3.10	1.05	72.78	79.26	345.38	328.00	12.27	12.70
LH28DH1 28	5.55	69.10	3.27	1.08	65.82	69.92	361.94	332.16	11.56	10.96
LH99DH1 37	5.67	69.90	3.36	1.10	*	*	*	*	*	*
LH56DH1 56	5.24	67.70	3.22	1.06	87.36	89.44	324.98	296.86	14.44	13.83
LH99DH2 121	5.65	70.80	3.38	1.10	*	*	*	*	*	*
LH99DH3 234	5.35	68.50	3.30	1.08	*	*	*	*	*	*
LH99DH4 365	5.41	69.80	3.30	1.08	*	*	*	*	*	*
LH99DH5 499	5.52	71.70	3.25	1.07	*	*	*	*	*	*
LH99DH6 609	5.61	72.40	3.29	1.08	91.80	*	499.25	*	*	*
1 2 DICHLOROETHANE .8% 23°C										
LL01DH1 1	4.79	64.90	3.05	1.01	80.02	84.52	364.32	329.54	14.29	14.72
LL07DH1 7	4.87	64.90	3.12	1.03	77.22	82.18	393.00	357.86	13.22	12.71
LL14DH1 14	5.32	67.50	3.18	1.04	77.68	78.84	405.34	359.90	11.53	11.94
LL28DH1 28	5.26	67.60	3.19	1.05	73.82	77.78	433.64	396.05	11.86	12.21
LL99DH1 37	5.60	70.80	3.27	1.06	*	*	*	*	*	*
LL56DH1 56	5.11	65.50	3.20	1.05	75.38	81.08	378.00	353.60	12.71	12.49
LL99DH2 101	5.67	72.60	3.30	1.08	*	*	*	*	*	*
LL99DH3 234	5.77	72.90	3.31	1.08	*	*	*	*	*	*
LL99DH4 365	5.69	72.20	3.29	1.07	*	*	*	*	*	*
LL99DH5 500	5.58	71.80	3.33	1.09	*	*	*	*	*	*
LL99DH6 606	6.16	74.20	3.43	1.12	98.69	*	674.33	*	*	*
1 2 DICHLOROETHANE .1% 50°C										
LH01DL1 1	4.82	65.90	3.03	1.01	75.88	85.18	388.58	364.72	14.90	15.32
LH07DL1 7	4.86	65.80	3.07	1.02	81.28	85.42	398.26	354.90	14.73	14.58
LH14DL1 14	4.80	63.70	3.13	1.03	80.10	84.70	336.92	327.96	13.52	13.61
LH28DL1 28	5.32	70.40	3.17	1.05	80.90	84.90	321.93	309.58	13.20	12.37
LH99DL1 37	5.02	67.20	3.18	1.05	*	*	*	*	*	*
LH56DL1 56	5.10	66.20	3.19	1.05	84.12	88.16	234.58	266.76	13.84	13.99
LH99DL2 121	5.12	68.30	3.21	1.06	*	*	*	*	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .1% 50°C										
LH99DL3 234	5.30	69.30	3.26	1.07	*	*	*	*	*	*
LH99DL4 364	5.34	68.60	3.31	1.08	*	*	*	*	*	*
LH99DL5 499	5.38	67.70	3.31	1.08	*	*	*	*	*	*
LH99DL6 609	5.38	69.20	3.32	1.08	91.94	*	536.00	*	*	*
1 2 DICHLOROETHANE .1% 23°C										
LL01DL1 1	4.62	63.50	3.00	1.00	80.72	86.86	365.20	326.38	16.44	16.10
LL07DL1 7	4.64	63.10	3.03	1.01	80.62	85.66	421.32	378.84	14.90	15.43
LL14DL1 14	4.55	61.90	3.06	1.01	79.56	83.44	392.24	337.82	14.40	14.29
LL28DL1 28	4.86	65.10	3.07	1.02	80.00	84.96	386.20	360.04	14.40	14.28
LL99DL1 37	4.43	60.50	3.07	1.02	*	*	*	*	*	*
LL56DL1 56	4.71	63.10	3.09	1.02	80.78	85.70	389.74	359.48	15.33	15.50
LL99DL2 101	4.51	61.10	3.10	1.03	*	*	*	*	*	*
LL99DL3 234	4.61	61.70	3.13	1.04	*	*	*	*	*	*
LL99DL4 364	4.67	62.40	3.15	1.04	*	*	*	*	*	*
LL99DL5 500	4.74	62.50	3.16	1.05	*	*	*	*	*	*
LL99DL6 606	4.77	63.00	3.17	1.05	91.05	*	745.50	*	*	*
1 2 DICHLOROETHANE .5% 50°C										
LH01DM1 1	5.33	69.30	3.16	1.04	78.60	82.96	377.04	351.54	13.01	13.16
LH07DM1 7	4.92	64.50	3.12	1.04	77.58	82.32	419.38	387.70	13.60	13.89
LH14DM1 14	4.94	64.30	3.18	1.04	75.50	80.44	361.74	329.02	12.85	12.58
LH28DM1 28	5.41	69.10	3.21	1.06	75.74	79.32	342.48	299.30	12.36	11.73
LH99DM1 37	5.36	69.10	3.24	1.07	*	*	*	*	*	*
LH56DM1 56	5.16	67.00	3.20	1.05	84.86	89.24	291.52	274.74	14.28	14.21
LH99DM2 121	5.53	70.80	3.30	1.08	*	*	*	*	*	*
LH99DM3 234	5.52	70.80	3.30	1.09	*	*	*	*	*	*
LH99DM4 365	5.56	70.70	3.31	1.08	*	*	*	*	*	*
LH99DM5 499	5.61	71.50	3.32	1.09	*	*	*	*	*	*
LH99DM6 609	5.77	72.10	3.36	1.10	90.15	*	479.67	*	*	*
1 2 DICHLOROETHANE .5% 23°C										
LL01DM1 1	4.82	66.10	3.03	1.00	81.32	86.16	360.46	306.08	15.68	15.23
LL07DM1 7	4.83	66.10	3.06	1.02	78.86	83.58	371.92	391.80	14.47	15.03
LL14DM1 14	4.87	63.70	3.12	1.03	77.96	80.96	359.62	354.82	11.93	11.96
LL28DM1 28	5.09	66.00	3.15	1.04	80.00	82.30	398.78	356.68	12.61	12.60
LL99DM1 37	4.77	62.10	3.13	1.06	*	*	*	*	*	*
LL56DM1 56	4.97	65.70	3.15	1.03	80.86	83.36	396.14	362.14	13.72	14.10
LL99DM2 102	4.83	63.00	3.16	1.07	*	*	*	*	*	*
LL99DM3 234	5.52	63.00	3.17	1.07	*	*	*	*	*	*
LL99DM4 365	5.00	63.90	3.20	1.08	*	*	*	*	*	*
LL99DM5 500	4.98	64.20	3.20	1.08	*	*	*	*	*	*
LL99DM6 606	4.89	63.70	3.18	1.07	93.23	*	790.20	*	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 8.0% 50°C										
LH01FH1 1	4.74	64.60	3.04	1.01	79.44	86.56	400.00	365.20	8.85	12.56
LH07FH1 7	7.03	78.80	3.59	1.15	48.48	50.32	*	243.20	7.46	7.06
LH14FH1 14	7.07	77.40	3.62	1.17	44.32	49.44	211.20	202.40	7.40	6.82
LH28FH1 28	7.12	78.70	3.71	1.16	51.44	51.96	244.00	213.60	6.02	6.26
LH99FH1 39	6.53	73.30	3.61	1.16	*	*	*	*	*	*
LH56FH1 56	7.64	81.90	3.69	1.18	47.44	48.12	244.00	200.80	4.92	4.41
LH99FH2 121	8.27	80.80	3.96	1.25	*	*	*	*	*	*
LH99FH3 233	6.90	71.50	3.71	1.28	*	*	*	*	*	*
LH99FH4 368	6.78	74.30	3.70	1.19	*	*	*	*	*	*
LH99FH5 499	7.58	78.20	3.82	1.22	*	*	*	*	*	*
LH99FH6 609	8.16	81.40	3.88	1.24	40.40	*	164.30	*	*	*
FURFURAL 8.0% 23°C										
LL01FH1 1	4.57	63.40	3.02	1.00	81.12	84.80	401.60	382.40	20.80	26.00
LL07FH1 7	7.01	79.80	3.57	1.15	44.84	50.24	246.40	229.60	9.02	8.74
LL14FH1 14	7.16	78.80	3.62	1.16	45.04	45.92	236.00	214.40	6.32	6.34
LL28FH1 28	6.99	78.10	3.70	1.16	55.92	56.08	321.60	281.60	7.80	6.82
LL99FH1 39	6.92	74.50	3.69	1.18	*	*	*	*	*	*
LL56FH1 56	6.83	73.50	3.66	1.17	44.56	48.08	249.60	239.20	6.08	5.44
LL99FH2 102	7.59	78.80	3.86	1.23	*	*	*	*	*	*
LL99FH3 233	7.86	79.20	3.90	1.24	*	*	*	*	*	*
LL99FH4 368	6.85	76.80	3.72	1.19	*	*	*	*	*	*
LL99FH5 500	7.43	78.20	3.78	1.21	*	*	*	*	*	*
LL99FH6 606	7.42	78.10	3.77	1.21	31.51	*	172.50	*	*	*
FURFURAL 1.0% 50°C										
LH01FL1 1	4.73	64.00	3.05	1.01	78.63	82.76	439.28	377.76	17.77	24.13
LH07FL1 7	4.99	66.00	3.13	1.03	81.04	84.84	416.00	405.60	17.08	16.66
LH14FL1 14	5.03	65.80	3.16	1.05	83.12	84.40	351.20	320.00	15.74	26.00
LH28FL1 28	5.12	66.30	3.19	1.05	79.60	81.36	315.20	321.60	12.46	11.88
LH99FL1 39	5.24	68.80	3.23	1.06	*	*	*	*	*	*
LH56FL1 56	5.27	67.10	3.24	1.06	78.64	84.00	325.60	285.60	12.16	11.54
LH56FL2 56	5.15	65.10	3.24	1.07	84.32	79.40	307.20	288.80	13.16	11.88
LH99FL2 121	5.59	71.40	3.32	1.08	*	*	*	*	*	*
LH99FL3 233	5.78	72.40	3.37	1.10	*	*	*	*	*	*
LH99FL4 367	5.92	73.20	3.40	1.10	*	*	*	*	*	*
LH99FL5 499	6.03	74.20	3.43	1.11	*	*	*	*	*	*
LH99FL6 609	6.10	74.80	3.43	1.12	90.50	*	411.00	*	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 1.0% 23°C										
LL01FL1 1	4.54	62.20	3.01	1.00	78.38	83.56	379.12	367.92	17.69	24.69
LL07FL1 7	4.66	63.20	3.05	1.01	80.08	86.80	395.60	389.20	17.96	19.42
LL14FL1 14	4.79	64.70	3.07	1.02	78.16	84.00	391.20	364.80	17.76	18.96
LL28FL1 28	4.84	64.90	3.10	1.02	78.56	82.96	440.80	410.40	14.22	14.97
LL99FL1 39	4.51	60.60	3.08	1.03	*	*	*	*	*	*
LL56FL1 56	4.69	61.20	3.12	1.03	78.72	83.76	420.00	389.60	15.06	14.90
LL56FL2 56	4.66	60.70	3.13	1.03	77.68	89.52	407.20	400.00	14.48	15.20
LL99FL2 102	4.63	61.60	3.11	1.05	*	*	*	*	*	*
LL99FL3 233	4.77	62.80	3.15	1.06	*	*	*	*	*	*
LL99FL4 367	4.86	63.00	3.17	1.06	*	*	*	*	*	*
LL99FL5 500	4.93	63.60	3.18	1.07	*	*	*	*	*	*
LL99FL6 606	4.98	63.90	3.20	1.18	90.23	*	752.17	*	*	*
FURFURAL 4.0% 50°C										
LH01FM1 1	5.19	66.40	3.19	1.05	75.80	77.54	416.46	388.00	14.70	18.73
LH07FM1 7	5.62	70.30	3.28	1.07	70.16	70.52	376.80	338.40	14.46	12.96
LH14FM1 14	5.69	70.20	3.34	1.09	65.44	68.56	340.00	316.80	11.82	11.30
LH28FM1 28	5.96	72.70	3.38	1.10	66.56	66.96	306.40	280.80	9.96	11.10
LH99FM1 39	5.82	71.90	3.38	1.10	*	*	*	*	*	*
LH56FM1 56	6.42	76.30	3.45	1.12	64.96	66.08	280.80	250.40	9.06	8.96
LH99FM2 121	6.64	80.10	3.57	1.15	*	*	*	*	*	*
LH99FM3 233	7.40	81.10	3.72	1.20	*	*	*	*	*	*
LH99FM4 367	7.15	80.50	3.67	1.19	*	*	*	*	*	*
LH99FM5 499	7.26	80.80	3.69	1.19	*	*	*	*	*	*
LH99FM6 609	7.20	80.00	3.66	1.18	70.60	*	291.00	*	*	*
FURFURAL 4.0% 23°C										
LL01FM1 1	4.91	64.80	3.09	1.03	77.93	78.20	400.00	354.80	15.81	19.29
LL07FM1 7	5.19	66.10	3.21	1.06	72.88	77.84	428.00	396.40	15.08	14.90
LL14FM1 14	5.51	69.30	3.26	1.07	69.60	70.72	440.00	383.20	12.34	13.44
LL28FM1 28	5.54	68.90	3.28	1.07	67.33	69.60	404.00	408.80	10.87	12.58
LL99FM1 39	*	*	*	*	*	*	*	*	*	*
LL56FM1 56	5.87	72.70	3.32	1.08	68.80	71.68	354.40	336.80	11.20	10.32
LL99FM2 105	5.98	73.80	3.40	1.10	*	*	*	*	*	*
LL99FM3 233	6.24	75.40	3.46	1.12	*	*	*	*	*	*
LL99FM4 367	6.05	73.80	3.40	1.11	*	*	*	*	*	*
LL99FM5 500	6.57	77.40	3.50	1.13	*	*	*	*	*	*
LL99FM6 606	6.90	79.10	3.61	1.17	72.32	*	430.58	*	*	*
METHYL ETHYL KETONE 26.0% 50°C										
LH01MH1 1	7.61	83.60	3.98	1.25	40.88	37.68	229.44	192.56	6.28	6.66
LH07MH1 7	7.18	84.20	3.75	1.20	47.28	49.20	313.28	218.80	8.55	8.02
LH14MH1 14	7.97	88.90	3.98	1.26	36.08	37.36	175.44	151.20	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 26.0% 50°C										
LH28MH1 28	7.68	86.00	3.87	1.24	32.71	34.12	169.30	166.48	6.17	5.49
LH99MH1 36	7.03	81.00	3.67	1.22	*	*	*	*	*	*
LH56MH1 55	7.22	82.90	3.77	1.21	34.48	32.38	168.07	146.24	6.03	5.67
LH99MH2 120	7.25	84.90	3.78	1.20	*	*	*	*	*	*
LH99MH3 247	6.37	76.50	3.47	1.11	*	*	*	*	*	*
LH99MH4 367	6.29	76.10	3.54	1.14	*	*	*	*	*	*
LH99MH5 500	6.04	75.20	3.41	1.09	*	*	*	*	*	*
LH99MH6 609	5.65	72.70	3.37	1.10	36.58	*	311.58	*	*	*
METHYL ETHYL KETONE 26.0% 23°C										
LL01MH1 1	7.64	86.40	3.87	1.23	40.88	37.84	237.68	195.12	6.56	7.30
LL07MH1 7	6.51	85.80	3.74	1.19	48.80	49.52	272.64	246.64	8.50	7.86
LL14MH1 14	6.52	80.40	3.61	1.16	56.40	56.40	340.56	311.76	10.94	11.34
LL28MH1 28	7.30	80.00	3.77	1.20	37.80	38.23	202.00	185.76	7.13	7.18
LL99MH1 36	7.11	78.90	3.79	1.20	*	*	*	*	*	*
LL56MH1 55	6.92	82.90	3.82	1.22	37.18	37.89	189.60	166.64	6.71	6.76
LL99MH2 109	5.96	75.60	3.60	1.17	*	*	*	*	*	*
LL99MH3 247	6.37	73.20	3.53	1.13	*	*	*	*	*	*
LL99MH4 367	6.01	72.20	3.50	1.12	*	*	*	*	*	*
LL99MH5 501	7.18	71.50	3.41	1.13	*	*	*	*	*	*
LL99MH6 606	6.03	73.10	3.53	1.13	65.77	*	601.60	*	*	*
METHYL ETHYL KETONE 3.0% 50°C										
LH01ML1 1	4.51	59.90	3.11	1.02	80.72	87.60	437.92	414.08	14.62	14.78
LH07ML1 7	4.72	61.60	3.17	1.05	80.24	85.12	378.56	403.76	16.22	16.98
LH14ML1 14	4.82	63.00	3.20	1.06	83.60	87.12	337.76	333.20	16.70	19.38
LH28ML1 28	5.27	66.90	3.27	1.07	80.60	84.57	337.44	336.24	14.42	12.49
LH99ML1 37	4.91	63.30	3.26	1.07	*	*	*	*	*	*
LH56ML1 55	5.41	68.50	3.25	1.17	81.58	87.85	312.48	316.88	14.89	13.76
LH99ML2 121	5.03	64.30	3.29	1.08	*	*	*	*	*	*
LH99ML3 247	4.99	63.90	3.27	1.07	*	*	*	*	*	*
LH99ML4 367	5.02	64.70	3.20	1.07	*	*	*	*	*	*
LH99ML5 500	5.01	64.20	3.28	1.07	*	*	*	*	*	*
LH99ML6 609	5.05	64.50	3.29	1.08	84.91	*	443.67	*	*	*
METHYL ETHYL KETONE 3.0% 23°C										
LL01ML1 1	4.48	60.80	3.03	1.00	86.16	87.44	419.12	395.04	17.74	16.50
LL07ML1 7	4.83	65.60	3.07	1.02	86.16	89.68	440.64	383.76	16.80	17.75
LL14ML1 14	4.83	66.10	3.09	1.02	83.92	87.28	420.32	392.64	*	*
LL28ML1 28	5.00	66.90	3.11	1.03	82.41	88.66	464.00	436.16	15.63	15.88
LL99ML1 37	4.66	62.40	3.11	1.04	*	*	*	*	*	*
LL56ML1 55	5.02	66.90	3.13	1.04	83.99	86.50	432.40	391.44	17.33	16.23
LL99ML2 109	4.76	63.40	3.15	1.06	*	*	*	*	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				METHYL ETHYL KETONE 3.0% 23°C						
LL99ML3 247	4.91	64.10	3.18	1.06	*	*	*	*	*	*
LL99ML4 367	4.99	64.20	3.27	1.08	*	*	*	*	*	*
LL99ML5 501	5.04	65.10	3.21	1.07	*	*	*	*	*	*
LL99ML6 606	5.06	65.50	3.23	1.08	90.57	*	739.00	*	*	*
				METHYL ETHYL KETONE 13.0% 50°C						
LH01MM1 1	5.40	67.10	3.41	1.10	66.80	66.32	409.04	358.56	11.96	10.86
LH07MM1 7	5.56	69.20	3.40	1.11	71.76	71.60	370.56	346.40	12.30	12.82
LH14MM1 14	6.18	66.60	3.47	1.12	62.32	66.48	289.12	277.12	12.10	12.86
LH28MM1 28	6.45	77.20	3.55	1.14	54.44	60.87	259.36	248.32	8.48	8.45
LH99MM1 37	5.91	71.90	3.51	1.13	*	*	*	*	*	*
LH56MM1 55	5.75	70.90	3.04	1.09	74.49	75.86	335.12	311.92	12.83	12.23
LH99MM2 121	5.92	72.10	3.51	1.13	*	*	*	*	*	*
LH99MM3 247	5.62	73.00	3.36	1.09	*	*	*	*	*	*
LH99MM4 367	5.12	66.70	3.27	1.07	*	*	*	*	*	*
LH99MM5 500	5.25	67.70	3.21	1.07	*	*	*	*	*	*
LH99MM6 609	5.22	67.60	3.31	1.08	73.29	*	528.92	*	*	*
				METHYL ETHYL KETONE 13.0% 23°C						
LL01MM1 1	5.46	63.10	3.27	1.06	73.68	75.76	448.48	412.88	13.54	11.62
LL07MM1 7	5.30	68.00	3.30	1.08	78.00	82.32	432.48	412.80	12.30	13.14
LL14MM1 14	5.60	72.50	3.33	1.08	71.92	78.00	346.64	395.20	14.58	15.30
LL28MM1 28	5.88	71.60	3.46	1.12	66.95	65.54	408.72	356.24	10.81	10.22
LL99MM1 37	5.65	69.40	3.39	1.12	*	*	*	*	*	*
LL56MM1 55	5.63	70.50	3.35	1.09	70.74	70.42	415.12	375.28	12.36	11.81
LL99MM2 109	5.81	72.80	3.50	1.17	*	*	*	*	*	*
LL99MM3 247	5.76	69.20	3.39	1.12	*	*	*	*	*	*
LL99MM4 367	5.51	68.50	3.36	1.11	*	*	*	*	*	*
LL99MM5 501	5.57	66.10	3.25	1.10	*	*	*	*	*	*
LL99MM6 606	5.53	69.10	3.37	1.08	79.31	*	678.80	*	*	*
				ASTM #2 OIL SATURATED 50°C						
LH01OM1 1	4.52	61.40	3.04	1.01	83.43	86.58	429.20	404.56	15.33	16.54
LH07OM1 7	4.45	59.60	3.09	1.02	85.21	95.72	383.68	416.32	18.43	20.31
LH14OM1 13	4.56	59.90	3.10	1.02	89.29	95.16	407.04	404.32	16.14	17.35
LH28OM1 28	4.81	62.90	3.17	1.04	88.80	92.00	344.00	308.00	12.20	12.70
LH99OM1 39	5.08	67.30	3.18	1.05	*	*	*	*	*	*
LH56OM1 56	4.95	63.10	3.22	1.06	89.43	91.21	340.72	306.96	13.31	14.13
LH99OM2 121	5.23	68.30	3.22	1.06	*	*	*	*	*	*
LH99OM3 247	5.23	68.40	3.23	1.06	*	*	*	*	*	*
LH99OM4 371	5.32	69.00	3.25	1.06	*	*	*	*	*	*
LH99OM5 494	5.28	68.80	3.26	1.07	*	*	*	*	*	*
LH99OM6 609	5.34	68.80	3.25	1.07	105.20	*	590.00	*	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
ASTM #2 OIL SATURATED 23°C										
LL010M1 1	4.42	60.00	3.00	1.00	85.80	88.46	445.20	415.28	15.31	18.05
LL070M1 7	4.67	62.90	3.02	1.01	87.62	93.85	455.92	428.48	16.50	17.94
LL140M1 13	4.54	61.10	3.01	1.01	88.07	94.57	443.60	442.72	15.95	16.91
LL280M1 28	4.57	61.40	3.05	1.01	85.60	90.00	468.00	452.00	13.50	13.00
LL990M1 39	4.67	64.60	3.07	1.02	*	*	*	*	*	*
LL560M1 56	4.61	62.20	3.06	1.02	84.07	92.47	413.92	460.16	15.96	16.65
LL990M2 105	4.76	65.20	3.10	1.02	*	*	*	*	*	*
LL990M3 247	4.89	66.20	3.13	1.03	*	*	*	*	*	*
LL990M4 371	4.96	66.60	3.15	1.04	*	*	*	*	*	*
LL990M5 494	4.98	67.20	3.16	1.04	*	*	*	*	*	*
LL990M6 606	5.03	67.30	3.17	1.04	98.68	*	673.00	*	*	*
ASTM #2 OIL 100.0% 50°C										
LH010P1 1	4.42	60.10	3.00	1.00	86.31	90.15	452.40	404.72	18.43	19.36
LH070P1 7	4.37	60.10	3.00	1.00	92.80	84.80	400.00	436.00	14.20	15.40
LH140P1 14	4.31	59.10	3.01	1.00	86.00	92.90	441.00	418.00	14.40	15.70
LH280P1 28	4.26	58.00	3.00	1.00	83.03	90.14	432.56	418.88	15.87	18.58
LH990P1 39	4.46	62.30	3.01	1.00	*	*	*	*	*	*
LH560P1 56	4.43	60.40	3.02	1.00	85.36	93.84	442.40	334.56	15.59	15.10
LH990P2 121	4.45	62.00	3.02	1.00	*	*	*	*	*	*
LH990P3 241	4.44	62.90	3.02	1.01	*	*	*	*	*	*
LH990P4 371	4.46	62.30	3.02	1.00	*	*	*	*	*	*
LH990P5 489	4.46	62.40	3.02	1.00	*	*	*	*	*	*
LH990P6 609	4.47	62.70	3.03	1.01	102.20	*	589.00	*	*	*
ASTM #2 OIL 100.0% 23°C										
LL010P1 1	4.25	58.00	3.00	1.00	86.50	91.72	446.80	421.76	19.03	19.93
LL070P1 7	4.43	60.50	3.00	1.00	80.70	87.10	457.00	411.00	14.00	14.70
LL140P1 14	4.37	60.90	3.00	0.99	82.40	91.60	400.00	388.00	14.20	15.90
LL280P1 28	4.49	61.40	3.00	1.00	87.69	90.14	447.68	397.84	17.48	17.25
LL990P1 39	4.14	57.90	3.00	1.00	*	*	*	*	*	*
LL560P1 56	4.31	58.70	3.00	1.00	87.60	90.16	354.16	389.68	16.38	17.62
LL990P2 106	4.13	57.80	3.00	1.00	*	*	*	*	*	*
LL990P3 241	4.15	57.70	3.01	1.00	*	*	*	*	*	*
LL990P4 371	4.16	57.90	3.00	1.00	*	*	*	*	*	*
LL990P5 489	4.15	57.80	3.01	1.00	*	*	*	*	*	*
LL990P6 606	4.16	58.00	3.01	1.00	82.80	*	710.30	*	*	*
PHENOL 8.0% 50°C										
LH01PH1 1	6.67	75.90	3.56	1.15	*	45.88	*	204.20	6.28	5.94
LH88PH1 1	2.40	*	*	*	87.79	*	87.79	*	*	*
LH07PH1 7	7.20	78.90	3.66	1.17	39.74	40.18	235.94	219.40	5.57	5.22

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 8.0% 50°C										
LH14PH1 14	7.56	81.80	3.70	1.19	42.02	41.84	219.10	198.14	4.86	5.02
LH28PH1 28	7.27	78.50	3.69	1.18	41.30	42.66	210.74	199.62	4.90	4.59
LH99PH1 38	6.30	75.80	3.47	1.12	*	*	*	*	*	*
LH56PH1 56	7.04	76.90	3.66	1.17	41.94	42.00	232.18	216.10	4.79	4.38
LH99PH2 120	6.12	74.40	3.42	1.10	*	*	*	*	*	*
LH99PH3 239	6.51	76.30	3.51	1.13	*	*	*	*	*	*
LH99PH4 375	8.16	85.00	3.86	1.22	*	*	*	*	*	*
LH99PH5 500	8.53	87.20	3.91	1.24	*	*	*	*	*	*
LH99PH6 609	8.83	88.60	3.94	1.25	29.40	*	181.00	*	*	*
PHENOL 8.0% 23°C										
LL01PH1 1	6.45	73.40	3.53	1.13	46.92	52.48	241.32	245.40	6.89	6.82
LL07PH1 7	7.64	81.70	3.76	1.18	34.46	36.34	187.58	184.72	4.00	4.20
LL14PH1 14	7.70	81.10	3.79	1.21	32.88	37.34	129.88	169.30	4.36	3.50
LL28PH1 28	7.69	80.30	3.80	1.21	35.70	37.82	177.40	159.08	4.15	4.39
LL99PH1 38	6.93	78.20	3.63	1.17	*	*	*	*	*	*
LL56PH1 56	7.79	81.30	3.77	1.21	35.30	36.64	188.04	172.52	4.26	3.84
LL99PH2 106	6.97	78.70	3.65	1.17	*	*	*	*	*	*
LL99PH3 239	6.70	76.90	3.52	1.15	*	*	*	*	*	*
LL99PH4 375	8.50	86.40	3.95	1.25	*	*	*	*	*	*
LL99PH5 501	8.58	97.70	3.95	1.23	*	*	*	*	*	*
LL99PH6 606	8.30	85.20	3.89	1.24	41.28	*	193.30	*	*	*
PHENOL 1.0% 50°C										
LH01PL1 1	4.63	62.50	3.06	1.01	81.62	86.14	408.68	362.06	15.45	15.61
LH07PL1 7	4.99	65.50	3.14	1.04	78.40	84.14	367.74	434.12	15.41	16.43
LH14PL1 14	5.19	66.90	3.19	1.05	81.02	83.38	417.84	406.84	15.11	14.93
LH28PL1 28	5.30	68.50	3.22	1.06	80.70	85.30	370.54	358.56	14.64	14.59
LH99PL1 37	5.17	68.00	3.22	1.06	*	*	*	*	*	*
LH56PL1 56	5.31	68.80	3.23	1.06	81.48	82.58	377.25	345.72	13.66	13.80
LH99PL2 120	5.27	69.20	3.26	1.07	*	*	*	*	*	*
LH99PL3 239	5.42	69.10	3.27	1.07	*	*	*	*	*	*
LH99PL4 374	5.36	69.30	3.27	1.07	*	*	*	*	*	*
LH99PL5 500	5.44	70.10	3.29	1.08	*	*	*	*	*	*
LH99PL6 609	5.45	69.20	3.28	1.07	93.90	*	481.00	*	*	*
PHENOL 1.0% 23°C										
LL01PL1 1	4.53	62.40	3.02	1.00	81.86	87.78	380.74	347.72	15.13	16.52
LL07PL1 7	4.60	62.20	3.06	1.01	83.32	87.16	399.60	350.12	16.61	16.25
LL14PL1 14	4.73	63.30	3.08	*	85.16	90.80	457.64	429.82	16.05	15.67
LL28PL1 28	4.89	64.80	3.11	1.03	86.08	92.50	441.90	409.64	15.94	15.60
LL99PL1 37	4.81	65.20	3.11	1.03	*	*	*	*	*	*
LL56PL1 56	4.92	64.50	3.15	1.03	81.96	88.30	449.72	428.64	15.47	16.11
LL99PL2 108	4.96	66.80	3.16	1.05	*	*	*	*	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 1.0% 23°C										
LL99PL3 240	5.09	67.30	3.00	1.05	*	*	*	*	*	*
LL99PL4 374	5.17	68.00	3.22	1.05	*	*	*	*	*	*
LL99PL5 501	5.30	68.90	3.25	1.07	*	*	*	*	*	*
LL99PL6 606	5.34	68.10	3.26	1.07	84.40	*	608.50	*	*	*
PHENOL 4.0% 50°C										
LH01PM1 1	5.44	68.40	3.26	1.06	68.44	70.38	420.80	391.42	12.48	10.96
LH07PM1 7	5.93	72.70	3.36	1.09	57.38	57.74	399.38	346.90	10.95	10.19
LH14PM1 14	5.87	67.20	3.40	1.10	63.14	61.64	376.10	316.02	10.65	9.55
LH28PM1 28	6.03	71.80	3.42	1.11	59.02	60.10	331.46	313.46	10.43	9.48
LH99PM1 37	5.79	72.80	3.34	1.09	*	*	*	*	*	*
LH56PM1 56	6.32	75.50	3.43	1.12	57.90	56.02	347.44	310.76	9.47	8.71
LH99PM2 120	5.69	72.00	3.31	1.08	*	*	*	*	*	*
LH99PM3 239	5.69	72.20	3.31	1.08	*	*	*	*	*	*
LH99PM4 375	5.82	72.80	3.34	1.09	*	*	*	*	*	*
LH99PM5 500	5.95	73.60	3.37	1.10	*	*	*	*	*	*
LH99PM6 609	6.11	74.80	3.38	1.10	64.90	*	349.00	*	*	*
PHENOL 4.0% 23°C										
LL01PM1 1	4.87	64.80	3.12	1.03	78.10	79.04	394.54	338.20	13.73	13.93
LL07PM1 7	5.82	71.20	3.34	1.09	58.62	59.46	397.18	355.08	10.09	9.52
LL14PM1 14	5.74	69.00	3.38	1.09	62.52	62.78	362.02	327.28	10.05	8.74
LL28PM1 28	5.95	71.50	3.40	1.11	54.28	55.44	381.90	346.48	9.54	8.74
LL99PM1 37	5.39	66.60	3.34	1.08	*	*	*	*	*	*
LL56PM1 56	6.25	73.80	3.42	1.12	56.94	56.90	344.90	297.04	9.82	8.20
LL99PM2 107	5.51	67.70	3.37	1.10	*	*	*	*	*	*
LL99PM3 240	5.61	68.40	3.00	1.10	*	*	*	*	*	*
LL99PM4 375	5.81	69.70	3.45	1.11	*	*	*	*	*	*
LL99PM5 501	5.90	63.10	3.46	1.12	*	*	*	*	*	*
LL99PM6 606	5.95	70.30	3.47	1.12	52.30	*	534.30	*	*	*
SODIUM CHLORIDE 35.0% 50°C										
LH01SH1 1	4.43	60.20	3.01	1.00	91.30	95.93	475.20	424.88	14.58	17.09
LH07SH1 7	4.43	60.10	3.00	1.00	88.28	96.18	410.96	410.24	16.13	*
LH14SH1 14	4.28	58.60	3.01	1.00	93.51	100.01	323.36	387.60	13.43	15.43
LH28SH1 28	4.25	58.60	3.01	1.00	99.86	97.72	400.64	382.48	16.45	14.00
LH99SH1 36	4.26	59.00	3.00	1.00	*	*	*	*	*	*
LH56SH1 56	4.27	58.90	3.00	1.00	90.23	101.05	370.48	322.00	12.75	14.03
LH99SH2 120	4.26	59.20	3.01	1.00	*	*	*	*	*	*
LH99SH3 241	4.26	59.00	3.00	1.00	*	*	*	*	*	*
LH99SH4 372	4.25	59.00	3.00	0.99	*	*	*	*	*	*
LH99SH5 492	4.25	59.10	3.00	1.00	*	*	*	*	*	*
LH99SH6 609	4.25	59.00	2.99	1.00	103.60	*	540.00	*	*	*

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM CHLORIDE 35.0% 23°C										
LL01SH1 1	4.38	59.80	3.01	1.00	84.90	93.69	359.80	405.92	15.07	15.58
LL07SH1 7	4.43	60.30	3.00	1.00	89.42	88.70	429.76	408.32	16.06	15.62
LL14SH1 14	4.29	59.70	3.01	1.00	85.93	92.22	434.16	425.92	15.35	17.08
LL28SH1 28	4.23	58.50	3.00	1.00	94.09	91.75	420.96	438.56	11.64	15.74
LL99SH1 36	4.21	58.50	3.01	1.00	*	*	*	*	*	*
LL56SH1 56	4.27	59.00	3.01	1.00	84.19	99.06	419.04	358.96	14.38	16.38
LL99SH2 108	4.24	58.90	3.00	1.00	*	*	*	*	*	*
LL99SH3 241	4.21	58.60	3.00	1.00	*	*	*	*	*	*
LL99SH4 372	4.21	58.50	3.01	1.00	*	*	*	*	*	*
LL99SH5 492	4.20	58.50	3.00	1.00	*	*	*	*	*	*
LL99SH6 606	4.20	58.60	3.00	1.00	85.33	*	807.50	*	*	*
SODIUM CHLORIDE 10.0% 50°C										
LH01SM1 1	4.59	64.30	3.02	1.00	83.76	91.28	405.68	385.68	13.66	15.82
LH07SM1 7	4.49	62.00	3.03	1.00	85.46	94.87	384.40	365.76	16.17	17.00
LH14SM1 15	4.70	64.30	3.03	1.00	86.34	89.96	396.16	344.00	14.21	15.84
LH28SM1 28	4.75	66.10	3.03	1.00	86.64	94.32	313.04	321.36	13.62	14.06
LH99SM1 36	4.33	59.90	3.02	1.01	*	*	*	*	*	*
LH56SM1 56	4.65	62.90	3.04	1.01	105.54	104.14	291.52	288.72	14.00	15.08
LH99SM2 120	4.34	60.00	3.03	1.01	*	*	*	*	*	*
LH99SM3 241	4.35	59.80	3.03	1.01	*	*	*	*	*	*
LH99SM4 372	4.35	60.50	3.02	1.01	*	*	*	*	*	*
LH99SM5 485	4.33	60.00	3.02	1.01	*	*	*	*	*	*
LH99SM6 609	4.34	59.90	3.02	1.00	105.90	*	498.30	*	*	*
SODIUM CHLORIDE 10.0% 23°C										
LL01SM1 1	4.56	63.70	3.01	1.00	82.80	88.56	416.64	395.76	12.90	15.86
LL07SM1 7	4.32	59.20	3.01	1.00	87.14	85.61	429.20	387.44	14.80	17.52
LL14SM1 15	4.76	66.30	3.01	1.00	85.24	90.41	412.72	386.30	15.63	16.94
LL28SM1 28	4.80	71.30	3.03	1.00	95.76	81.68	327.04	381.12	12.78	14.34
LL99SM1 36	4.30	59.40	3.03	1.00	*	*	*	*	*	*
LL56SM1 56	4.66	64.30	3.04	1.01	95.27	102.15	284.32	277.84	13.95	15.33
LL99SM2 107	4.31	59.20	3.03	1.03	*	*	*	*	*	*
LL99SM3 241	4.32	59.30	3.03	1.01	*	*	*	*	*	*
LL99SM4 372	4.31	59.10	3.03	1.00	*	*	*	*	*	*
LL99SM5 485	4.30	59.40	3.02	1.01	*	*	*	*	*	*
LL99SM6 606	4.30	59.20	3.03	1.00	84.63	*	665.92	*	*	*
WATER 100.0% 50°C										
LH01WP1 1	4.65	64.30	3.03	1.01	85.50	104.56	404.10	305.68	13.94	15.14
LH07WP1 7	4.97	68.30	3.08	1.02	95.28	103.60	295.36	316.88	10.94	12.54
LH14WP1 14	4.85	65.70	3.10	1.03	87.92	91.44	348.08	386.72	13.30	13.14
LH28WP1 28	4.87	66.10	3.12	1.03	96.08	102.32	305.92	309.92	12.50	13.90

EPICHLOROHYDRIN RUBBER: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
WATER 100.0% 50°C										
LH99WP1 36	5.01	67.50	3.17	1.04	*	*	*	*	*	*
LH56WP1 55	5.41	70.40	3.16	1.05	101.58	112.25	295.52	292.88	13.96	15.35
LH99WP2 120	5.17	68.70	3.21	1.05	*	*	*	*	*	*
LH99WP3 241	5.21	69.10	3.22	1.06	*	*	*	*	*	*
LH99WP4 364	5.24	69.20	3.23	1.06	*	*	*	*	*	*
LH99WP5 483	5.25	69.30	3.06	1.06	*	*	*	*	*	*
LH99WP6 609	5.26	69.00	3.23	1.06	105.00	*	538.00	*	*	*
WATER 100.0% 23°C										
LL01WP1 1	4.63	65.40	3.01	1.00	96.40	104.72	302.00	312.32	12.98	14.06
LL07WP1 7	4.75	67.20	3.02	1.01	97.36	100.72	323.12	281.68	13.22	16.06
LL14WP1 14	4.64	64.10	3.03	1.01	88.08	93.52	409.12	398.88	15.22	15.94
LL28WP1 28	4.65	63.70	3.05	1.01	86.16	103.76	378.16	317.92	14.26	15.26
LL99WP1 36	4.31	59.60	3.05	1.01	*	*	*	*	*	*
LL56WP1 55	5.05	68.00	3.06	1.01	108.49	108.30	308.88	294.48	16.37	15.83
LL99WP2 108	4.39	60.80	3.09	1.03	*	*	*	*	*	*
LL99WP3 241	4.50	61.60	3.12	1.03	*	*	*	*	*	*
LL99WP4 364	4.57	61.70	3.14	1.04	*	*	*	*	*	*
LL99WP5 483	4.62	62.10	3.15	1.04	*	*	*	*	*	*
LL99WP6 606	4.66	62.40	3.17	1.04	84.69	*	609.83	*	*	*
POTASSIUM DICHROMATE 10.0% 50°C										
LH01XM1 1	4.57	62.90	3.02	1.01	90.12	99.50	450.32	419.28	14.88	16.01
LH07XM1 7	4.41	59.40	3.04	1.01	89.85	92.17	454.64	409.20	14.02	15.82
LH14XM1 14	4.47	60.40	3.06	1.02	97.69	96.78	426.00	385.20	15.63	18.09
LH28XM1 28	4.37	59.50	3.05	1.01	102.79	95.50	409.92	400.73	16.59	15.19
LH99XM1 39	4.73	65.60	3.10	1.03	*	*	*	*	*	*
LH56XM1 56	4.99	67.80	3.10	1.02	95.48	98.23	325.04	316.00	13.17	13.62
LH99XM2 120	4.78	65.90	3.11	1.03	*	*	*	*	*	*
LH99XM3 247	4.79	65.80	3.11	1.03	*	*	*	*	*	*
LH99XM4 373	4.80	65.90	3.11	1.02	*	*	*	*	*	*
LH99XM5 493	4.77	65.80	3.08	1.03	*	*	*	*	*	*
LH99XM6 609	4.81	65.70	3.09	1.02	110.60	*	557.00	*	*	*
POTASSIUM DICHROMATE 10.0% 23°C										
LL01XM1 1	4.51	63.00	3.00	1.00	88.18	95.24	352.24	425.92	13.65	16.65
LL07XM1 7	4.39	59.60	3.00	1.00	83.69	95.27	423.92	418.48	14.36	15.42
LL14XM1 14	4.38	60.10	3.02	1.01	90.52	102.22	435.28	330.64	15.51	17.43
LL28XM1 28	4.27	58.40	3.04	1.01	96.10	91.11	379.20	434.00	15.74	15.49
LL99XM1 39	4.57	63.50	3.05	1.01	*	*	*	*	*	*
LL56XM1 56	4.49	61.00	3.04	1.02	90.38	96.39	443.52	418.00	11.51	14.16
LL99XM2 107	4.63	64.10	3.06	1.02	*	*	*	*	*	*
LL99XM3 247	4.70	64.80	3.09	1.02	*	*	*	*	*	*
LL99XM4 373	4.73	64.90	3.09	1.02	*	*	*	*	*	*
LL99XM5 493	4.73	64.90	3.09	1.03	*	*	*	*	*	*
LL99XM6 606	4.76	65.40	3.10	1.03	93.61	*	583.92	*	*	*

EPI_CO :   STATISTICS

EPICHLOROHYDRIN: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
HYDROCHLORIC ACID 10.0% 50°C												
LH01AM1 1	5	3.650	5	2.160	5	46.400	5	26.430	5	0.817	5	0.456
LH07AM1 7	5	2.567	5	3.250	5	13.910	5	7.266	5	0.975	5	0.665
LH14AM1 14	5	2.851	5	1.338	5	38.413	5	9.104	5	0.228	5	0.559
LH28AM1 27	5	2.120	5	3.666	5	23.130	5	28.263	5	0.702	5	0.361
LH56AM1 56	5	7.732	5	4.180	5	55.590	5	23.110	5	0.392	5	0.752
HYDROCHLORIC ACID 10.0% 23°C												
LL01AM1 1	5	1.210	5	1.190	5	26.380	5	17.420	5	0.794	5	0.268
LL07AM1 7	5	1.730	5	3.940	5	6.470	5	15.290	5	0.838	5	0.551
LL14AM1 14	5	1.210	5	1.452	5	14.630	5	16.270	5	0.510	5	0.600
LL28AM1 27	5	0.557	5	1.594	5	13.340	5	14.630	5	0.632	5	0.186
LL56AM1 56	5	2.232	5	1.250	5	32.485	5	8.900	5	0.732	5	0.527
SODIUM HYDROXIDE 10.0% 50°C												
LH01BM1 1	5	1.326	5	4.716	5	16.922	5	25.525	5	0.086	5	0.402
LH07BM1 7	5	3.192	5	1.658	5	31.025	5	7.508	5	0.334	5	0.310
LH14BM1 14	5	1.279	5	2.670	5	15.632	5	13.860	5	0.336	5	0.142
LH28BM1 28	5	1.365	5	0.893	5	20.023	5	7.649	5	0.301	5	0.130
LH56BM1 56	5	3.179	5	0.777	5	57.272	5	14.173	5	0.234	5	0.248
SODIUM HYDROXIDE 10.0% 23°C												
LL01BM1 1	5	1.466	5	1.099	5	25.128	5	18.108	5	0.157	5	0.162
LL07BM1 7	5	0.598	5	2.869	5	15.583	5	13.342	5	0.269	5	0.306
LL14BM1 14	5	2.114	5	1.611	5	32.420	5	14.697	5	0.121	5	0.667
LL28BM1 28	5	9.464	5	2.110	5	67.840	5	24.668	5	0.176	5	0.294
LL56BM1 56	5	0.930	5	1.262	5	19.867	5	16.300	5	0.132	5	0.116
1 2 DICHLOROETHANE .8% 50°C												
LH01DH1 1	5	2.778	5	1.108	5	16.551	5	17.032	5	0.130	5	0.310
LH07DH1 7	5	1.180	5	4.130	5	8.370	5	44.070	5	0.270	5	0.280
LH14DH1 14	5	1.960	5	1.180	5	24.220	5	4.510	5	0.140	5	0.210
LH28DH1 28	5	1.065	5	1.124	5	7.013	5	15.142	5	0.270	5	0.334
LH56DH1 56	5	3.113	5	1.624	5	27.884	5	12.625	5	0.224	5	0.377
1 2 DICHLOROETHANE .8% 23°C												
LL01DH1 1	5	0.682	5	1.270	5	8.548	5	18.528	5	0.229	5	0.329
LL07DH1 7	5	1.320	5	0.720	5	2.360	5	10.510	5	0.440	5	0.160
LL14DH1 14	5	0.380	5	2.180	5	13.830	5	30.180	5	0.380	5	0.290
LL28DH1 28	5	2.327	4	0.929	5	12.185	4	9.881	5	0.356	5	0.319
LL56DH1 56	5	3.364	5	1.759	5	18.106	5	20.800	5	0.320	5	0.209

EPICHLOROHYDRIN: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
1 2 DICHLOROETHANE .1% 50°C												
LH01DL1 1	5	5.791	5	2.455	5	71.876	5	13.524	5	0.444	5	0.413
LH07DL1 7	5	0.950	5	1.030	5	25.350	5	33.950	5	0.200	5	0.370
LH14DL1 14	5	2.550	5	2.340	5	41.760	5	13.830	5	0.220	5	0.230
LH28DL1 28	4	3.590	5	0.688	4	25.890	5	7.895	5	0.352	5	0.458
LH56DL1 56	5	2.493	5	1.365	5	3.283	5	11.038	5	0.267	5	0.338
1 2 DICHLOROETHANE .1% 23°C												
LL01DL1 1	5	1.907	5	2.697	5	38.447	5	17.485	5	0.276	5	0.233
LL07DL1 7	5	1.200	5	1.340	5	18.100	5	16.970	5	0.380	5	0.530
LL14DL1 14	5	2.430	5	1.390	5	16.870	5	17.800	5	0.130	5	0.590
LL28DL1 28	5	1.062	5	1.340	5	13.722	5	9.930	5	0.581	5	0.198
LL56DL1 56	5	1.551	5	2.340	5	19.322	5	7.532	5	0.381	5	0.213
1 2 DICHLOROETHANE .5% 50°C												
LH01DM1 1	5	2.488	5	2.256	5	17.038	5	18.720	5	0.098	5	0.642
LH07DM1 7	5	0.410	5	1.290	5	4.470	5	21.140	5	0.290	5	0.210
LH14DM1 14	5	1.480	5	1.500	5	11.430	5	17.790	5	0.310	5	0.340
LH28DM1 28	5	1.599	5	1.716	5	21.536	5	17.579	5	0.293	5	0.373
LH56DM1 56	5	4.226	5	2.272	5	26.862	5	11.256	5	0.289	5	0.228
1 2 DICHLOROETHANE .5% 23°C												
LL01DM1 1	5	1.637	5	1.289	5	15.719	5	14.677	5	0.337	5	0.329
LL07DM1 7	5	3.450	5	1.320	5	75.610	5	11.800	5	0.340	5	0.130
LL14DM1 14	5	1.140	5	2.440	5	45.490	5	36.340	5	0.290	5	0.440
LL28DM1 28	5	1.697	5	1.295	5	5.309	5	14.570	5	0.128	5	0.160
LL56DM1 56	5	0.826	5	1.773	5	19.685	5	25.401	5	0.416	5	0.124
FURFURAL 8.0% 50°C												
LH01FH1 1	5	1.992	5	1.280	5	30.590	5	14.250	5	0.265	5	0.256
LH07FH1 7	5	3.229	5	1.682	*	*	5	7.160	5	0.923	5	1.006
LH14FH1 14	5	4.573	5	1.780	5	28.480	5	5.370	5	1.125	5	0.342
LH28FH1 28	5	1.403	5	1.802	5	5.660	5	15.320	5	0.148	5	0.358
LH56FH1 56	5	1.729	5	1.947	5	8.000	5	3.350	5	0.217	5	0.233
FURFURAL 8.0% 23°C												
LL01FH1 1	5	1.841	5	2.154	5	45.830	5	36.400	5	1.065	5	3.819
LL07FH1 7	5	1.472	5	2.695	5	20.710	5	14.310	5	2.063	5	1.770
LL14FH1 14	5	1.663	5	0.335	5	13.860	5	10.040	5	0.192	5	0.910
LL28FH1 28	5	1.145	5	1.706	5	3.580	5	5.370	5	1.102	5	1.418
LL56FH1 56	5	1.081	5	2.028	5	13.450	5	20.860	5	0.502	5	0.089

EPICHLOROHYDRIN: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				FURFURAL 1.0% 50°C								
LH01FL1 1	5	0.822	5	0.816	5	15.529	5	5.918	5	0.615	5	1.211
LH07FL1 7	5	1.802	5	3.341	5	18.550	5	21.650	5	0.889	5	0.450
LH14FL1 14	5	1.425	5	2.622	5	9.120	5	28.430	5	0.602	5	0.594
LH28FL1 28	5	6.705	5	4.460	5	25.040	5	11.520	5	0.227	5	0.459
LH56FL2 56	5	1.635	5	1.442	5	17.300	5	22.520	5	0.230	5	0.250
LH56FL1 56	5	1.640	5	1.549	5	14.860	5	4.560	5	0.546	5	0.055
				FURFURAL 1.0% 23°C								
LL01FL1 1	5	4.764	5	2.300	5	61.827	5	14.676	5	0.504	5	1.661
LL07FL1 7	5	6.108	5	1.649	5	78.100	5	15.970	5	0.531	5	0.952
LL14FL1 14	5	5.040	5	2.513	5	57.650	5	30.380	5	0.288	5	1.171
LL28FL1 28	5	3.401	5	1.889	5	46.600	5	10.810	5	0.325	5	0.567
LL56FL2 56	5	6.873	5	6.321	5	44.850	5	24.170	5	0.327	5	0.367
LL56FL1 56	5	2.806	5	1.152	5	19.180	5	29.340	5	0.462	5	0.424
				FURFURAL 4.0% 50°C								
LH01FM1 1	5	1.183	5	1.759	5	20.565	5	12.635	5	0.472	5	0.776
LH07FM1 7	5	1.930	5	2.076	5	13.680	5	14.590	5	1.073	5	1.163
LH14FM1 14	5	1.340	5	2.892	5	12.330	5	7.160	5	0.486	5	0.604
LH28FM1 28	5	1.004	5	1.315	5	12.840	5	9.120	5	2.285	5	1.515
LH56FM1 56	5	1.043	5	1.277	5	7.160	5	14.310	5	0.114	5	0.270
				FURFURAL 4.0% 23°C								
LL01FM1 1	5	0.961	5	2.438	5	17.674	5	29.536	5	1.069	5	0.353
LL07FM1 7	5	0.715	5	1.370	5	35.100	5	23.170	5	0.563	5	0.800
LL14FM1 14	5	1.523	5	1.480	5	22.630	5	15.590	5	0.364	5	0.673
LL28FM1 28	5	2.838	5	0.400	5	6.930	5	17.980	5	0.390	5	0.701
LL56FM1 56	5	1.625	5	1.534	5	23.600	5	14.810	5	0.235	5	0.277
				METHYL ETHYL KETONE 26.0% 50°C								
LH01MH1 1	5	2.920	5	2.300	5	11.920	5	11.460	5	0.730	5	0.330
LH07MH1 7	5	1.210	5	2.040	5	*	5	9.470	5	0.530	5	0.870
LH14MH1 14	5	2.690	5	2.147	5	5.860	5	3.795	*	*	*	*
LH28MH1 28	5	2.360	5	3.409	4	10.026	5	19.494	5	0.624	5	0.431
LH56MH1 55	5	2.370	5	4.750	5	12.950	5	14.790	5	0.330	5	0.200
				METHYL ETHYL KETONE 26.0% 23°C								
LL01MH1 1	5	1.660	5	1.910	5	10.890	5	10.320	5	0.800	5	0.370
LL07MH1 7	5	1.840	5	1.450	5	14.080	5	16.570	5	0.670	5	0.767
LL14MH1 14	5	1.870	5	1.876	5	33.620	5	9.495	5	0.555	5	0.261
LL28MH1 28	5	6.966	5	1.706	5	45.300	5	5.289	5	0.165	5	0.748
LL56MH1 55	5	1.730	5	2.100	5	7.640	5	5.750	5	0.390	5	0.290

EPICHLOROHYDRIN: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
METHYL ETHYL KETONE 3.0% 50°C												
LH01ML1 1	5	1.214	5	1.386	5	32.855	5	7.785	5	0.390	5	0.807
LH07ML1 7	5	6.510	5	2.999	5	71.803	5	8.513	5	1.238	5	1.404
LH14ML1 14	5	3.250	5	2.810	5	3.160	5	4.750	5	0.424	5	1.430
LH28ML1 28	5	8.143	5	3.197	5	57.868	5	7.647	5	0.099	5	0.488
LH56ML1 55	5	2.018	5	3.063	5	7.680	5	10.830	5	0.255	5	0.412
METHYL ETHYL KETONE 3.0% 23°C												
LL01ML1 1	5	4.912	5	4.644	5	12.470	5	20.480	5	0.498	5	0.374
LL07ML1 7	5	1.187	5	2.806	5	10.470	5	44.230	5	0.756	5	1.370
LL14ML1 14	5	2.010	5	1.660	5	26.460	5	13.510	*	*	*	*
LL28ML1 28	5	1.513	5	1.678	5	14.371	5	11.353	5	0.443	5	0.908
LL56ML1 55	5	1.533	5	1.520	5	20.520	5	26.730	5	0.339	5	0.215
METHYL ETHYL KETONE 13.0% 50°C												
LH01MM1 1	5	2.713	5	1.658	5	14.418	5	9.613	5	0.385	5	0.498
LH07MM1 7	5	1.990	5	0.980	5	18.720	5	12.480	5	0.283	5	0.830
LH14MM1 14	5	9.288	5	1.212	5	55.600	5	8.980	5	0.400	5	0.865
LH28MM1 28	5	6.359	5	1.931	5	37.640	5	13.751	5	0.730	5	0.568
LH56MM1 55	5	3.250	5	2.540	5	27.470	5	12.950	5	0.195	5	0.517
METHYL ETHYL KETONE 13.0% 23°C												
LL01MM1 1	5	2.007	5	1.820	5	7.340	5	8.380	5	0.330	5	0.360
LL07MM1 7	5	1.130	5	1.210	5	8.580	5	14.500	5	0.550	5	1.300
LL14MM1 14	5	8.940	5	1.130	5	52.650	5	21.200	5	0.593	5	0.735
LL28MM1 28	5	2.919	5	1.111	5	39.854	5	29.441	5	0.592	5	1.194
LL56MM1 55	5	1.950	5	1.780	5	5.720	5	22.220	5	0.133	5	0.280
ASTM #2 OIL SATURATED 50°C												
LH010M1 1	5	1.877	5	3.035	5	11.790	5	45.050	5	0.614	5	0.305
LH070M1 7	5	8.718	5	0.446	5	93.521	5	6.510	5	0.901	5	2.900
LH140M1 13	5	1.447	5	1.250	5	24.454	5	7.770	5	0.470	5	0.661
LH280M1 28	5	1.600	5	1.600	5	32.000	5	16.000	5	0.500	5	0.600
LH560M1 56	5	2.066	5	2.511	5	10.367	5	28.502	5	0.292	5	0.248
ASTM #2 OIL 100.0% 23°C												
LL010M1 1	5	2.615	5	2.057	5	9.137	5	9.631	5	1.248	5	0.263
LL070M1 7	5	1.696	5	1.699	5	17.651	5	7.989	5	0.405	5	0.444
LL140M1 13	5	2.083	5	1.674	5	24.533	5	5.940	5	0.511	5	0.332
LL280M1 28	5	0.400	5	2.800	5	16.000	5	28.000	5	0.200	5	0.040
LL560M1 56	5	5.398	5	1.848	5	75.219	5	20.704	5	0.306	5	0.353

EPICHLOROHYDRIN: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				ASTM #2 OIL SATURATED 50°C								
LH01OP1 1	5	1.780	5	2.839	5	32.409	5	8.251	5	0.694	5	1.213
LH07OP1 7	5	2.400	5	0.800	5	36.000	5	12.000	5	0.200	5	0.500
LH14OP1 14	5	1.400	5	0.900	5	5.200	5	16.000	5	0.300	5	0.300
LH28OP1 28	5	3.550	5	0.918	5	44.720	5	10.520	5	0.404	5	0.254
LH56OP1 56	5	1.735	5	1.735	5	13.651	5	24.288	5	1.070	5	1.407
				ASTM #2 OIL 100.0% 23°C								
LL01OP1 1	5	1.048	5	2.629	5	31.382	5	33.417	5	0.492	5	0.672
LL07OP1 7	5	1.100	5	1.900	5	24.000	5	14.500	5	0.300	5	0.300
LL14OP1 14	5	3.200	5	11.200	5	51.000	5	75.000	5	0.200	5	0.200
LL28OP1 28	5	1.676	5	1.299	5	13.896	5	15.328	5	0.399	5	0.429
LL56OP1 56	5	3.347	5	1.640	5	68.251	5	16.725	5	0.522	5	0.593
				PHENOL 8.0% 50°C								
LH01PH1 1	*	*	5	1.930	*	*	5	12.680	5	0.222	5	0.160
LH88PH1 1	*	*	*	*	*	*	5	*	*	*	*	*
LH07PH1 7	5	1.571	5	1.334	5	36.120	5	25.295	5	0.062	5	0.200
LH14PH1 14	5	1.440	5	1.210	5	14.690	5	12.170	5	0.150	5	0.137
LH28PH1 28	5	1.823	5	1.670	5	10.282	5	6.070	5	0.210	5	0.172
LH56PH1 56	5	3.047	5	1.528	5	25.391	5	24.077	5	0.134	5	0.189
				PHENOL 8.0% 23°C								
LL01PH1 1	5	1.366	5	2.671	5	6.109	5	9.666	5	0.411	5	0.329
LL07PH1 7	5	3.850	5	4.350	5	25.501	5	10.430	5	2.245	5	0.155
LL14PH1 14	5	3.080	5	2.310	5	25.240	5	10.860	5	0.540	5	1.330
LL28PH1 28	5	3.200	5	2.163	5	18.300	5	8.123	5	0.380	5	0.223
LL56PH1 56	5	1.070	5	3.074	5	9.857	5	16.719	5	0.183	5	0.185
				PHENOL 1.0% 50°C								
LH01PL1 1	5	1.300	5	1.920	5	6.500	5	10.200	5	0.210	5	0.530
LH07PL1 7	5	7.496	5	2.418	5	98.707	5	25.151	5	0.828	5	0.417
LH14PL1 14	5	2.420	5	3.170	5	19.600	5	31.780	5	0.089	5	0.156
LH28PL1 28	5	1.808	5	1.839	5	14.067	5	13.970	5	0.335	5	0.604
LH56PL1 56	5	0.900	5	2.610	5	4.450	5	17.177	5	0.288	5	0.356
				PHENOL 1.0% 23°C								
LL01PL1 1	5	1.200	5	1.530	5	9.420	5	21.460	5	0.200	5	0.290
LL07PL1 7	5	0.565	5	1.353	5	9.718	5	12.593	5	0.391	5	0.338
LL14PL1 14	5	2.190	5	1.840	5	45.560	5	13.400	5	0.460	5	0.104
LL28PL1 28	5	1.250	5	1.306	5	6.154	5	6.118	5	0.262	5	0.372
LL56PL1 56	5	0.927	5	2.435	5	3.571	5	8.399	5	0.300	5	0.369

EPICHLOROHYDRIN: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

		NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
PHENOL 4.0% 50°C													
LH01PM1	1	5	1.230	5	1.200	5	17.880	5	22.700	5	0.120	5	0.200
LH07PM1	7	5	1.151	5	0.867	5	9.449	5	19.844	5	0.265	5	0.143
LH14PM1	14	5	0.401	5	1.396	5	15.330	5	21.372	5	0.446	5	0.181
LH28PM1	28	5	1.420	5	1.100	5	8.000	5	5.590	5	0.290	5	0.310
LH56PM1	56	5	2.148	5	2.066	5	13.897	5	15.343	5	0.274	5	0.392
PHENOL 4.0% 23°C													
LL01PM1	1	5	1.903	5	0.776	5	7.649	5	17.089	5	0.139	5	0.473
LL07PM1	7	5	1.409	5	1.033	5	18.052	5	14.728	5	0.153	5	0.153
LL14PM1	14	5	0.930	5	1.598	5	16.826	5	8.950	5	0.223	5	0.210
LL28PM1	28	5	1.357	5	1.032	5	16.892	5	17.464	5	0.224	5	0.123
LL56PM1	56	5	0.765	5	0.635	5	6.971	5	24.537	5	0.058	5	0.201
SODIUM CHLORIDE 35.0% 50°C													
LH01SH1	1	5	1.450	5	1.630	5	14.883	5	30.829	5	0.297	5	0.247
LH07SH1	7	5	4.059	5	1.850	5	45.730	5	10.015	5	0.126	*	*
LH14SH1	14	5	7.810	5	1.693	5	86.289	5	14.814	5	0.168	5	0.135
LH28SH1	28	5	0.547	5	0.752	5	30.481	5	12.522	5	0.334	5	0.166
LH56SH1	56	5	1.408	5	2.798	5	15.179	5	7.228	5	0.287	5	0.337
SODIUM CHLORIDE 35.0% 23°C													
LL01SH1	1	5	6.392	5	0.887	4	99.194	5	14.700	5	0.167	5	0.296
LL07SH1	7	5	4.594	5	3.222	5	48.778	5	32.933	5	0.224	5	0.349
LL14SH1	14	5	1.116	5	1.487	5	21.071	5	15.382	5	*	5	0.229
LL28SH1	28	5	0.703	5	3.734	5	17.987	5	61.988	5	0.201	5	0.341
LL56SH1	56	5	1.590	5	1.544	5	23.242	5	39.765	5	0.429	5	0.105
SODIUM CHLORIDE 10.0% 50°C													
LH01SM1	1	5	1.315	5	3.030	5	30.590	5	40.160	5	0.477	5	0.460
LH07SM1	7	5	1.519	5	1.640	5	21.855	5	30.524	5	0.586	5	0.605
LH14SM1	15	5	0.804	5	1.140	5	12.000	5	29.240	5	0.895	5	0.908
LH28SM1	28	5	4.397	5	2.160	5	53.417	5	31.500	5	0.642	5	0.931
LH56SM1	56	5	1.724	5	2.340	5	6.400	5	18.980	5	0.690	5	0.311
SODIUM CHLORIDE 10.0% 23°C													
LL01SM1	1	5	1.880	5	0.361	5	24.130	5	20.170	5	0.910	5	0.300
LL07SM1	7	5	1.588	5	1.450	5	18.182	5	13.990	5	0.648	5	0.599
LL14SM1	15	5	4.409	5	2.090	5	39.607	5	27.640	5	0.412	5	0.452
LL28SM1	28	5	0.367	5	2.010	5	9.430	5	28.590	5	0.807	5	0.261
LL56SM1	56	5	0.991	5	1.420	5	8.720	5	10.910	5	0.560	5	0.670

EPICHLOROHYDRIN: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
WATER 100.0% 50°C												
LH01WP1 1	5	6.100	5	1.740	5	71.300	5	13.470	5	0.384	5	1.040
LH07WP1 7	5	2.230	5	0.800	5	30.620	5	11.898	5	0.430	5	0.540
LH14WP1 14	5	2.010	5	1.730	5	17.730	5	16.430	5	0.141	5	0.385
LH28WP1 28	5	1.560	5	2.160	5	19.850	5	17.010	5	0.447	5	0.510
LH56WP1 55	5	2.660	5	1.890	5	27.740	5	12.180	5	1.760	5	1.210
WATER 100.0% 23°C												
LL01WP1 1	5	2.530	5	1.210	5	3.400	5	3.490	5	0.180	5	0.570
LL07WP1 7	5	0.361	5	1.750	5	8.380	5	10.913	5	0.415	5	0.590
LL14WP1 14	5	2.230	5	1.212	5	30.730	5	18.150	5	0.832	5	0.167
LL28WP1 28	5	3.810	5	0.880	5	39.720	5	19.800	5	0.300	5	1.080
LL56WP1 55	5	2.045	5	3.010	5	11.820	5	15.108	5	0.667	5	1.440
POTASSIUM DICHROMATE 10.0% 50°C												
LH01XM1 1	5	0.994	5	3.828	5	8.404	5	33.411	5	0.196	5	0.195
LH07XM1 7	5	1.572	5	0.820	5	23.784	5	6.493	5	0.279	5	0.506
LH14XM1 14	5	1.638	5	1.804	5	23.968	5	27.820	5	0.295	5	0.857
LH28XM1 28	5	1.256	5	3.191	5	18.761	5	38.948	5	0.425	5	2.673
LH56XM1 56	5	1.906	5	0.812	5	28.340	5	12.182	5	0.572	5	1.205
POTASSIUM DICHROMATE 10.0% 23°C												
LL01XM1 1	5	3.738	5	1.983	5	*	5	33.267	5	0.159	5	0.185
LL07XM1 7	5	12.878	5	1.179	5	*	5	21.488	5	0.533	5	0.359
LL14XM1 14	5	2.858	5	0.927	5	25.244	5	28.332	5	0.266	5	0.891
LL28XM1 28	5	3.048	5	6.557	5	35.539	5	75.463	5	0.246	5	0.238
LL56XM1 56	5	3.806	5	2.315	5	55.074	5	33.707	5	0.942	5	0.168

EPI_CO : RETENTION OF PROPERTIES

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				HYDROCHLORIC ACID 10.0% 50°C						
LH01AM1	1	3.1	1.5	4.1	94	103	107	118	97	112
LH07AM1	7	5.1	3.9	6.8	98	114	116	125	92	99
LH14AM1	14	5.4	3.8	8.1	108	113	112	116	84	101
LH28AM1	27	8.0	7.0	13.8	103	116	116	122	87	104
LH99AM1	39	8.0	4.7	9.9	*	*	*	*	*	*
LH56AM1	56	10.1	7.4	15.2	100	125	93	93	84	98
LH99AM2	121	15.5	10.5	25.2	*	*	*	*	*	*
LH99AM3	241	23.6	14.9	32.5	*	*	*	*	*	*
LH99AM4	374	26.1	15.5	35.2	*	*	*	*	*	*
LH99AM5	484	31.1	18.2	43.0	*	*	*	*	*	*
LH99AM6	609	33.0	18.9	45.2	83	*	63	*	*	*
				HYDROCHLORIC ACID 10.0% 23°C						
LL01AM1	1	1.1	.2	1.1	92	101	115	117	91	109
LL07AM1	7	1.5	.7	1.8	96	108	113	118	98	113
LL14AM1	14	1.7	.7	1.8	101	104	114	114	85	111
LL28AM1	27	1.9	1.2	2.1	101	107	116	120	98	116
LL99AM1	39	1.5	.7	2.0	*	*	*	*	*	*
LL56AM1	56	3.2	2.2	4.8	106	116	84	92	92	103
LL99AM2	101	2.1	1.4	2.9	*	*	*	*	*	*
LL99AM3	241	2.2	1.2	2.6	*	*	*	*	*	*
LL99AM4	374	2.9	1.2	2.0	*	*	*	*	*	*
LL99AM5	484	3.0	1.0	3.1	*	*	*	*	*	*
LL99AM6	606	3.9	1.7	4.0	98	*	114	*	*	*
				SODIUM HYDROXIDE 10.0% 50°C						
LH01BM1	1	1.3	.5	1.1	101	105	122	119	87	101
LH07BM1	7	1.3	1.3	1.8	101	107	93	110	91	109
LH14BM1	14	2.0	.9	.9	101	101	100	101	83	92
LH28BM1	28	1.3	.3	.4	101	110	80	78	74	83
LH99BM1	38	*	.6	.2	*	*	*	*	*	*
LH56BM1	56	2.9	1.4	2.3	103	110	77	93	73	92
LH99BM2	121	1.8	1.0	1.5	*	*	*	*	*	*
LH99BM3	241	2.7	.8	*	*	*	*	*	*	*
LH99BM4	373	.7	*	.3	*	*	*	*	*	*
LH99BM5	485	.1	.3	.9	*	*	*	*	*	*
LH99BM6	609	2.0	.3	.2	122	*	48	*	*	*
				SODIUM HYDROXIDE 10.0% 23°C						
LL01BM1	1	.5	.7	1.1	94	103	113	120	84	102
LL07BM1	7	.8	.2	.1	99	104	123	125	91	105
LL14BM1	14	1.1	.5	.5	95	104	118	118	88	110
LL28BM1	28	1.6	1.1	2.1	99	106	82	124	95	108
LL99BM1	38	1.9	1.2	2.7	*	*	*	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				SODIUM HYDROXIDE 10.0% 23°C						
LL56BM1	56	2.6	1.1	3.4	103	102	120	139	90	109
LL99BM2	101	1.8	1.0	2.8	*	*	*	*	*	*
LL99BM3	241	4.0	1.4	2.7	*	*	*	*	*	*
LL99BM4	373	2.5	2.1	3.0	*	*	*	*	*	*
LL99BM5	485	1.9	1.0	2.1	*	*	*	*	*	*
LL99BM6	606	2.0	1.2	2.6	95	*	82	*		
				1 2 DICHLOROETHANE .8% 50°C						
LH01DH1	1	6.2	1.1	5.6	88	93	101	95	86	90
LH07DH1	7	20.6	7.8	22.2	88	85	99	108	82	78
LH14DH1	14	17.9	8.6	17.7	79	87	93	96	75	84
LH28DH1	28	24.8	12.4	32.0	72	77	98	97	70	72
LH99DH1	37	32.3	14.2	40.8	*	*	*	*	*	*
LH56DH1	56	17.6	9.9	24.9	95	98	88	87	88	91
LH99DH2	121	31.8	15.7	44.3	*	*	*	*	*	*
LH99DH3	234	24.7	11.9	33.9	*	*	*	*	*	*
LH99DH4	365	26.2	14.1	35.6	*	*	*	*	*	*
LH99DH5	499	28.7	17.2	36.1	*	*	*	*	*	*
LH99DH6	609	30.7	18.3	40.2	105	*	66	*	*	*
				1 2 DICHLOROETHANE .8% 23°C						
LL01DH1	1	6.6	3.3	6.5	87	93	98	96	87	97
LL07DH1	7	9.0	5.4	13.1	84	90	106	104	81	84
LL14DH1	14	18.3	8.2	20.0	84	87	110	105	70	79
LL28DH1	28	17.8	8.7	21.2	80	85	117	115	72	80
LL99DH1	37	22.1	9.9	27.9	*	*	*	*	*	*
LL56DH1	56	17.5	8.4	22.0	82	89	102	103	78	82
LL99DH2	101	23.7	12.7	34.5	*	*	*	*	*	*
LL99DH3	234	25.9	13.2	35.6	*	*	*	*	*	*
LL99DH4	365	24.1	12.1	32.4	*	*	*	*	*	*
LL99DH5	500	21.8	11.5	35.1	*	*	*	*	*	*
LL99DH6	606	34.4	15.2	47.5	112	*	89	*	*	*
				1 2 DICHLOROETHANE .1% 50°C						
LH01DL1	1	3.1	1.5	3.5	82	94	105	106	91	101
LH07DL1	7	6.9	3.8	9.2	88	94	108	103	90	96
LH14DL1	14	10.3	5.1	13.3	87	93	91	96	82	90
LH28DL1	28	14.5	8.1	19.6	88	93	87	90	80	81
LH99DL1	37	14.6	7.5	20.0	*	*	*	*	*	*
LH56DL1	56	15.2	7.8	20.3	91	97	63	78	84	92
LH99DL2	121	16.9	9.3	24.1	*	*	*	*	*	*
LH99DL3	234	21.0	10.9	29.5	*	*	*	*	*	*
LH99DL4	364	21.8	9.8	30.9	*	*	*	*	*	*
LH99DL5	499	22.9	8.3	29.8	*	*	*	*	*	*
LH99DL6	609	22.7	10.7	33.3	105	*	71	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
			1 2 DICHLOROETHANE .1% 23°C						
LL01DL1 1	1.5	.6	.8	88	95	99	95	100	106
LL07DL1 7	3.9	2.1	4.6	88	94	114	110	91	102
LL14DL1 14	5.0	2.5	6.1	86	92	106	98	88	94
LL28DL1 28	6.5	3.5	7.8	87	93	104	105	88	94
LL99DL1 37	6.6	3.2	8.4	*	*	*	*	*	*
LL56DL1 56	7.3	3.8	9.1	88	94	105	105	93	102
LL99DL2 101	8.3	4.3	11.6	*	*	*	*	*	*
LL99DL3 234	10.7	5.3	14.3	*	*	*	*	*	*
LL99DL4 364	12.2	6.5	16.5	*	*	*	*	*	*
LL99DL5 500	13.8	6.7	17.9	*	*	*	*	*	*
LL99DL6 606	14.7	7.5	19.9	104	*	98	*	*	*
			1 2 DICHLOROETHANE .5% 50°C						
LH01DM1 1	17.2	10.2	20.6	85	91	102	102	79	87
LH07DM1 7	11.5	5.9	14.3	84	90	113	113	83	91
LH14DM1 14	14.3	7.5	19.1	82	88	98	96	78	83
LH28DM1 28	18.0	9.3	24.1	82	87	93	87	75	77
LH99DM1 37	20.6	10.0	26.9	*	*	*	*	*	*
LH56DM1 56	16.0	8.4	22.0	92	98	79	80	87	93
LH99DM2 121	24.4	12.7	34.2	*	*	*	*	*	*
LH99DM3 234	24.2	12.7	35.0	*	*	*	*	*	*
LH99DM4 365	25.0	12.6	34.2	*	*	*	*	*	*
LH99DM5 499	26.2	13.9	37.4	*	*	*	*	*	*
LH99DM6 609	29.7	14.8	41.2	103	*	63	*	*	*
			1 2 DICHLOROETHANE .5% 23°C						
LL01DM1 1	3.9	2.0	3.4	88	95	97	89	96	100
LL07DM1 7	6.2	4.3	8.1	86	92	101	114	88	99
LL14DM1 14	11.2	5.1	12.1	85	89	97	103	73	79
LL28DM1 28	13.9	6.8	16.9	87	90	108	104	77	83
LL99DM1 37	14.5	6.2	17.6	*	*	*	*	*	*
LL56DM1 56	12.4	6.3	15.4	88	92	107	106	84	93
LL99DM2 102	15.9	7.7	21.6	*	*	*	*	*	*
LL99DM3 234	32.5	7.7	21.7	*	*	*	*	*	*
LL99DM4 365	20.0	9.2	25.9	*	*	*	*	*	*
LL99DM5 500	19.5	9.7	26.4	*	*	*	*	*	*
LL99DM6 606	17.3	8.9	24.2	106	*	104	*	*	*
			FURFURAL 8.0% 50°C						
LH01FH1 1	4.7	2.7	6.1	86	95	108	106	54	83
LH07FH1 7	53.1	23.9	71.3	53	55	*	71	45	46
LH14FH1 14	60.2	26.9	78.4	48	54	57	59	45	45
LH28FH1 28	58.1	26.3	81.4	56	57	66	62	37	41
LH99FH1 39	58.7	26.4	77.7	*	*	*	*	*	*
LH56FH1 56	65.9	29.4	88.6	52	53	66	59	30	29

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
			FURFURAL	8.0% 50°C					
LH99FH2 121	101.0	39.3	131.1	*	*	*	*	*	*
LH99FH3 233	67.9	23.3	96.1	*	*	*	*	*	*
LH99FH4 368	64.8	28.1	88.6	*	*	*	*	*	*
LH99FH5 499	84.3	34.8	111.1	*	*	*	*	*	*
LH99FH6 609	98.5	40.3	124.9	46	*	22	*	*	*
			FURFURAL	8.0% 23°C					
LL01FH1 1	1.2	.8	1.8	88	93	109	111	127	171
LL07FH1 7	51.9	24.5	70.0	49	55	67	67	55	58
LL14FH1 14	60.3	27.3	78.2	49	50	64	63	39	42
LL28FH1 28	55.6	25.8	79.6	61	62	87	82	48	45
LL99FH1 39	66.7	26.9	85.5	*	*	*	*	*	*
LL56FH1 56	62.1	26.5	80.8	48	53	67	70	37	36
LL99FH2 102	83.1	34.2	113.5	*	*	*	*	*	*
LL99FH3 233	89.6	34.9	118.2	*	*	*	*	*	*
LL99FH4 368	65.2	30.8	94.2	*	*	*	*	*	*
LL99FH5 500	79.1	33.2	103.7	*	*	*	*	*	*
LL99FH6 606	78.9	33.0	102.6	36	*	23	*	*	*
			FURFURAL	1.0% 50°C					
LH01FL1 1	4.5	2.2	5.3	85	91	119	110	108	159
LH07FL1 7	11.4	6.6	15.5	88	93	112	118	104	110
LH14FL1 14	13.9	7.2	18.0	90	93	95	93	96	171
LH28FL1 28	16.1	8.7	21.5	87	89	85	94	76	78
LH99FL1 39	17.7	8.7	24.5	*	*	*	*	*	*
LH56FL1 56	19.4	10.9	27.6	85	92	88	83	74	76
LH56FL2 56	19.6	10.2	26.8	92	87	83	84	80	78
LH99FL2 121	25.5	12.8	35.6	*	*	*	*	*	*
LH99FL3 233	29.7	14.4	41.7	*	*	*	*	*	*
LH99FL4 367	32.9	15.6	45.0	*	*	*	*	*	*
LH99FL5 499	35.4	17.2	49.7	*	*	*	*	*	*
LH99FL6 609	37.0	18.2	51.4	103	*	54	*	*	*
			FURFURAL	1.0% 23°C					
LL01FL1 1	1.5	1.0	1.6	85	92	102	107	108	162
LL07FL1 7	4.1	1.9	4.6	87	95	107	113	110	128
LL14FL1 14	6.0	3.5	7.7	85	92	106	106	108	125
LL28FL1 28	8.3	4.8	11.3	85	91	119	120	87	98
LL99FL1 39	8.3	3.9	10.5	*	*	*	*	*	*
LL56FL1 56	10.7	5.7	12.9	86	92	114	114	92	98
LL56FL2 56	10.2	5.2	13.1	84	98	110	117	88	100
LL99FL2 102	11.2	5.7	15.2	*	*	*	*	*	*
LL99FL3 233	14.6	7.7	20.4	*	*	*	*	*	*
LL99FL4 367	16.7	8.1	21.2	*	*	*	*	*	*
LL99FL5 500	18.5	9.1	24.4	*	*	*	*	*	*
LL99FL6 606	19.7	9.6	38.3	103	*	99	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
FURFURAL 4.0% 50°C										
LH01FM1	1	16.6	8.1	20.0	82	85	113	113	90	123
LH07FM1	7	25.0	12.5	32.0	76	77	102	99	88	85
LH14FM1	14	29.4	14.9	39.8	71	75	92	92	72	74
LH28FM1	28	32.9	16.3	43.9	72	74	83	82	61	73
LH99FM1	39	32.4	16.2	44.3	*	*	*	*	*	*
LH56FM1	56	40.2	20.2	55.4	71	73	76	73	55	59
LH99FM2	121	51.1	29.4	77.8	*	*	*	*	*	*
LH99FM3	233	68.3	31.0	95.6	*	*	*	*	*	*
LH99FM4	367	62.7	30.0	89.6	*	*	*	*	*	*
LH99FM5	499	65.0	30.5	92.0	*	*	*	*	*	*
LH99FM6	609	63.7	29.2	87.3	80	*	38	*	*	*
FURFURAL 4.0% 23°C										
LL01FM1	1	10.7	5.7	12.3	85	86	108	103	96	127
LL07FM1	7	18.9	9.8	24.1	79	86	116	116	92	98
LL14FM1	14	23.0	12.0	30.3	76	78	119	112	75	88
LL28FM1	28	25.0	12.6	32.1	73	76	109	119	66	83
LL99FM1	39	100.0	100.0	100.0	*	*	*	*	*	*
LL56FM1	56	28.3	14.7	37.7	75	79	96	98	68	68
LL99FM2	105	34.2	16.2	46.1	*	*	*	*	*	*
LL99FM3	233	40.1	18.7	54.4	*	*	*	*	*	*
LL99FM4	367	35.9	16.2	46.9	*	*	*	*	*	*
LL99FM5	500	47.5	21.9	62.0	*	*	*	*	*	*
LL99FM6	606	54.8	24.6	75.6	82	*	57	*	*	*
METHYL ETHYL KETONE 26.0% 50°C										
LH01MH1	1	72.6	38.4	130.2	44	41	62	56	38	44
LH07MH1	7	68.5	43.4	115.0	51	54	85	64	52	53
LH14MH1	14	76.8	41.1	135.7	39	41	47	44	37	46
LH99MH1	36	60.7	29.4	93.1	*	*	*	*	*	*
LH56MH1	55	61.3	33.5	102.7	37	36	45	43	37	37
LH99MH2	120	65.7	35.6	105.2	*	*	*	*	*	*
LH99MH3	247	45.6	22.2	57.8	*	*	*	*	*	*
LH99MH4	367	43.7	21.6	63.3	*	*	*	*	*	*
LH99MH5	500	38.2	20.1	49.2	*	*	*	*	*	*
LH99MH6	609	29.2	16.1	43.4	42	*	41	*	*	*
METHYL ETHYL KETONE 26.0% 23°C										
LL01MH1	1	66.1	36.9	117.8	44	42	64	57	40	48
LL07MH1	7	40.4	34.1	99.3	53	54	74	72	52	52
LL14MH1	14	43.8	27.0	76.8	61	62	92	91	67	75
LL28MH1	28	67.4	33.3	102.2	41	42	55	54	44	47
LL99MH1	36	69.1	33.1	102.8	*	*	*	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
			METHYL ETHYL KETONE 26.0% 23°C						
LL56MH1 55	56.5	35.9	111.3	40	42	51	49	41	44
LL99MH2 109	41.7	27.5	79.1	*	*	*	*	*	*
LL99MH3 247	51.3	23.4	64.6	*	*	*	*	*	*
LL99MH4 367	42.7	21.8	59.9	*	*	*	*	*	*
LL99MH5 501	70.6	20.6	55.0	*	*	*	*	*	*
LL99MH6 606	43.4	23.3	64.3	75	*	79	*	*	*
			METHYL ETHYL KETONE 3.0% 50°C						
LH01ML1 1	6.8	3.6	10.6	88	96	118	121	89	97
LH07ML1 7	12.0	6.4	17.9	87	94	102	118	99	112
LH14ML1 14	15.5	8.6	22.3	91	96	91	97	102	128
LH28ML1 28	20.1	10.6	28.8	88	93	91	98	88	82
LH99ML1 37	20.0	10.1	28.7	*	*	*	*	*	*
LH56ML1 55	19.1	9.8	38.5	89	97	84	92	91	91
LH99ML2 121	23.0	11.8	32.5	*	*	*	*	*	*
LH99ML3 247	22.1	11.1	30.6	*	*	*	*	*	*
LH99ML4 367	22.7	12.5	28.8	*	*	*	*	*	*
LH99ML5 500	22.5	11.7	31.0	*	*	*	*	*	*
LH99ML6 609	23.5	12.2	33.1	97	*	59	*	*	*
			METHYL ETHYL KETONE 3.0% 23°C						
LL01ML1 1	2.0	1.3	2.7	94	96	113	115	108	109
LL07ML1 7	4.7	2.8	6.8	94	99	119	112	102	117
LL14ML1 14	5.7	3.3	8.8	91	96	114	114		
LL28ML1 28	8.1	4.7	11.6	90	97	125	127	95	104
LL99ML1 37	9.8	4.9	13.5	*	*	*	*	*	*
LL56ML1 55	9.1	6.0	14.6	91	95	117	114	106	107
LL99ML2 109	12.2	6.6	18.3	*	*	*	*	*	*
LL99ML3 247	15.5	7.7	21.6	*	*	*	*	*	*
LL99ML4 367	17.6	7.9	26.8	*	*	*	*	*	*
LL99ML5 501	18.7	9.4	25.7	*	*	*	*	*	*
LL99ML6 606	19.3	10.1	27.8	103	*	97	*	*	*
			METHYL ETHYL KETONE 13.0% 50°C						
LH01MM1 1	27.6	15.5	45.6	73	73	111	105	73	71
LH07MM1 7	28.9	16.5	46.2	78	79	100	101	75	84
LH14MM1 14	35.4	4.4	36.2	68	73	78	81	74	85
LH28MM1 28	41.3	22.2	64.7	59	67	70	72	52	56
LH99MM1 37	40.2	20.4	60.0	*	*	*	*	*	*
LH56MM1 55	26.7	13.8	25.9	81	83	91	91	78	80
LH99MM2 121	40.5	20.8	60.7	*	*	*	*	*	*
LH99MM3 247	33.3	22.3	50.0	*	*	*	*	*	*
LH99MM4 367	21.4	11.7	30.5	*	*	*	*	*	*
LH99MM5 500	24.7	13.4	30.1	*	*	*	*	*	*
LH99MM6 609	24.0	13.2	35.1	83	*	70	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
			METHYL ETHYL KETONE 13.0% 23°C						
LL01MM1 1	11.8	10.1	27.1	80	83	121	120	83	76
LL07MM1 7	21.7	13.5	35.2	85	90	117	120	75	86
LL14MM1 14	22.4	13.6	36.0	78	86	94	115	89	101
LL28MM1 28	35.1	19.1	54.1	73	72	110	104	66	67
LL99MM1 37	34.7	17.4	50.5	*	*	*	*	*	*
LL56MM1 55	26.7	14.8	40.3	77	77	112	109	75	78
LL99MM2 109	38.6	23.2	68.9	*	*	*	*	*	*
LL99MM3 247	37.3	17.1	49.1	*	*	*	*	*	*
LL99MM4 367	31.5	15.9	44.6	*	*	*	*	*	*
LL99MM5 501	32.7	11.8	34.5	*	*	*	*	*	*
LL99MM6 606	32.0	16.9	43.4	90	*	90	*	*	*
			ASTM #2 OIL 100.0% 50°C						
LH010M1 1	2.6	1.5	3.8	91	95	116	118	93	109
LH070M1 7	6.4	4.0	9.9	93	105	104	121	112	134
LH140M1 13	8.0	4.2	10.4	97	105	110	118	98	114
LH280M1 28	12.2	7.3	17.5	97	101	93	90	74	84
LH990M1 39	14.6	7.2	19.4	*	*	*	*	*	*
LH560M1 56	16.3	7.9	22.5	97	100	92	89	81	93
LH990M2 121	18.2	8.8	23.9	*	*	*	*	*	*
LH990M3 247	18.1	8.9	25.1	*	*	*	*	*	*
LH990M4 371	20.1	9.9	26.9	*	*	*	*	*	*
LH990M5 494	19.3	9.6	27.3	*	*	*	*	*	*
LH990M6 609	20.6	9.6	27.1	120	*	78	*	*	*
			ASTM #2 OIL 100.0% 23°C						
LL010M1 1	.5	.3	.1	93	97	120	121	93	119
LL070M1 7	2.0	.8	2.1	95	103	123	125	101	118
LL140M1 13	1.3	1.5	3.0	96	104	120	129	97	111
LL280M1 28	4.2	1.8	4.5	93	99	126	132	82	86
LL990M1 39	5.1	2.4	6.7	*	*	*	*	*	*
LL560M1 56	5.0	2.6	7.1	91	102	112	134	97	110
LL990M2 105	7.1	3.3	9.7	*	*	*	*	*	*
LL990M3 247	9.9	4.9	13.3	*	*	*	*	*	*
LL990M4 371	11.4	5.5	15.3	*	*	*	*	*	*
LL990M5 494	12.0	6.5	17.2	*	*	*	*	*	*
LL990M6 606	13.1	6.7	17.9	112	*	89	*	*	*
			ASTM #2 OIL 100.0% 50°C						
LH010P1 1	.2	.7	.7	94	99	122	118	112	127
LH070P1 7	.4	.5	.6	101	93	108	127	87	101
LH140P1 14	.4	.2	.6	93	102	119	122	88	103
LH280P1 28	.5	.2	.1	90	99	117	122	97	122

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
			ASTM #2 OIL 100.0% 50°C						
LH990P1 39	2.1	.2	1.3	*	*	*	*	*	*
LH560P1 56	1.0	.5	1.3	93	103	120	98	95	99
LH990P2 121	1.8	.3	1.0	*	*	*	*	*	*
LH990P3 241	1.5	1.1	3.2	*	*	*	*	*	*
LH990P4 371	2.1	.2	1.5	*	*	*	*	*	*
LH990P5 489	2.1	.3	1.8	*	*	*	*	*	*
LH990P6 609	2.3	.8	2.8	116	*	78	*	*	*
			ASTM #2 OIL 100.0% 23°C						
LL010P1 1	.4	.2	.3	94	101	121	123	116	131
LL070P1 7	.2	.2	*	88	96	124	120	85	97
LL140P1 14	.1	.2	.3	90	101	108	113	87	105
LL280P1 28	.1	.6	.9	95	99	121	116	107	113
LL990P1 39	.2	.2	.2	*	*	*	*	*	*
LL560P1 56	.2	.2	.2	95	99	96	114	100	116
LL990P2 106	.4	.3	.5	*	*	*	*	*	*
LL990P3 241	*	.5	.1	*	*	*	*	*	*
LL990P4 371	.4	.2	.1	*	*	*	*	*	*
LL990P5 489	.1	.3	.3	*	*	*	*	*	*
LL990P6 606	.3	*	.7	94	*	94	*	*	*
			PHENOL 8.0% 50°C						
LH01PH1 1	48.8	23.8	68.2	*	50	*	60	38	39
LH88PH1 1	140.0	100.0	100.0	100	*	100	*	*	*
LH07PH1 7	60.2	27.5	82.2	43	44	64	64	34	34
LH14PH1 14	67.4	30.7	92.6	46	46	59	58	30	33
LH28PH1 28	66.1	29.8	89.3	45	47	57	58	30	30
LH99PH1 38	41.0	19.7	55.0	*	*	*	*	*	*
LH56PH1 56	61.8	28.0	81.8	46	46	63	63	29	29
LH99PH2 120	36.9	17.5	48.1	*	*	*	*	*	*
LH99PH3 239	45.7	20.5	59.4	*	*	*	*	*	*
LH99PH4 375	82.7	34.3	112.3	*	*	*	*	*	*
LH99PH5 500	90.9	37.8	123.6	*	*	*	*	*	*
LH99PH6 609	97.7	40.0	129.8	33	*	24	*	*	*
			PHENOL 8.0% 23°C						
LL01PH1 1	43.8	20.7	60.4	51	58	65	72	42	45
LL07PH1 7	70.4	31.4	94.9	37	40	51	54	24	28
LL14PH1 14	76.4	34.0	105.1	36	41	35	49	27	23
LL28PH1 28	77.4	34.3	106.2	39	42	48	46	25	29
LL99PH1 38	57.9	25.1	76.9	*	*	*	*	*	*
LL56PH1 56	76.9	34.2	104.9	38	40	51	50	26	25
LL99PH2 106	58.8	25.9	79.7	*	*	*	*	*	*
LL99PH3 239	52.7	23.0	66.2	*	*	*	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
PHENOL 8.0% 23°C										
LL99PH4	375	93.8	38.2	128.3	*	*	*	*	*	*
LL99PH5	501	95.5	56.3	153.9	*	*	*	*	*	*
LL99PH6	606	89.2	36.3	119.5	47	*	25	*	*	*
PHENOL 1.0% 50°C										
LH01PL1	1	2.8	2.3	6.0	89	95	110	106	94	103
LH07PL1	7	11.7	6.3	15.9	85	92	99	127	94	108
LH14PL1	14	15.1	7.9	20.8	88	92	113	119	92	98
LH28PL1	28	17.7	9.3	23.9	88	94	100	105	89	96
LH99PL1	37	17.5	8.5	23.5	*	*	*	*	*	*
LH56PL1	56	19.2	10.8	27.0	89	91	102	101	83	91
LH99PL2	120	20.0	10.4	27.7	*	*	*	*	*	*
LH99PL3	239	23.3	10.2	28.4	*	*	*	*	*	*
LH99PL4	374	21.9	10.5	28.6	*	*	*	*	*	*
LH99PL5	500	23.8	11.8	32.5	*	*	*	*	*	*
LH99PL6	609	24.0	10.4	29.7	107	*	63	*	*	*
PHENOL 1.0% 23°C										
LL01PL1	1	.7	.6	1.9	89	96	103	101	92	109
LL07PL1	7	5.0	2.8	6.2	91	96	108	102	101	107
LL14PL1	14	7.0	3.4	100.0	93	100	124	125	98	103
LL28PL1	28	9.5	5.0	12.4	94	102	119	119	97	103
LL99PL1	37	9.5	4.5	11.8	*	*	*	*	*	*
LL56PL1	56	12.2	6.6	15.9	89	97	122	125	94	106
LL99PL2	108	12.8	7.1	18.2	*	*	*	*	*	*
LL99PL3	240	15.8	7.9	13.5	*	*	*	*	*	*
LL99PL4	374	17.6	9.0	22.8	*	*	*	*	*	*
LL99PL5	501	20.6	10.4	27.8	*	*	*	*	*	*
LL99PL6	606	21.5	9.1	27.2	96	*	80	*	*	*
PHENOL 4.0% 50°C										
LH01PM1	1	21.3	10.3	27.9	74	77	114	114	76	72
LH07PM1	7	30.9	15.6	40.8	62	63	108	101	67	67
LH14PM1	14	34.5	11.4	39.8	69	68	102	92	65	63
LH28PM1	28	36.1	17.5	48.6	64	66	90	91	64	62
LH99PM1	37	28.1	14.3	38.7	*	*	*	*	*	*
LH56PM1	56	38.5	18.9	52.3	63	62	94	91	58	57
LH99PM2	120	25.9	13.0	34.6	*	*	*	*	*	*
LH99PM3	239	25.8	13.3	35.2	*	*	*	*	*	*
LH99PM4	375	28.8	14.3	38.6	*	*	*	*	*	*
LH99PM5	500	31.8	15.5	43.2	*	*	*	*	*	*
LH99PM6	609	35.3	17.4	45.8	74	*	46	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				PHENOL 4.0% 23°C						
LL01PM1	1	9.1	7.5	14.8	85	87	107	99	84	92
LL07PM1	7	30.1	15.6	40.6	64	65	107	104	62	63
LL14PM1	14	32.8	16.2	43.3	68	69	98	95	61	58
LL28PM1	28	35.8	18.0	48.5	59	61	103	101	58	58
LL99PM1	37	28.6	13.1	36.7	*	*	*	*	*	*
LL56PM1	56	39.4	19.8	52.6	62	63	93	87	60	54
LL99PM2	107	31.5	14.9	42.1	*	*	*	*	*	*
LL99PM3	240	33.8	16.1	28.0	*	*	*	*	*	*
LL99PM4	375	38.6	18.3	51.6	*	*	*	*	*	*
LL99PM5	501	40.7	7.1	39.0	*	*	*	*	*	*
LL99PM6	606	41.8	19.4	55.6	60	*	70	*	*	*
				SODIUM CHLORIDE 35.0% 50°C						
LH01SH1	1	.7	.3	.1	99	105	128	124	89	112
LH07SH1	7	.6	.2	.1	96	106	111	120	98	
LH14SH1	14	.7	.7	1.5	102	110	87	113	82	102
LH28SH1	28	.9	.7	1.0	109	107	108	112	100	92
LH99SH1	36	.8	.2	.1	*	*	*	*	*	*
LH56SH1	56	.8	.7	1.0	98	111	100	94	78	92
LH99SH2	120	.7	.2	.4	*	*	*	*	*	*
LH99SH3	241	.7	.2	.2	*	*	*	*	*	*
LH99SH4	372	.6	.2	.7	*	*	*	*	*	*
LH99SH5	492	.5	*	.2	*	*	*	*	*	*
LH99SH6	609	.6	.2	.7	118	*	71	*	*	*
				SODIUM CHLORIDE 35.0% 23°C						
LL01SH1	1	.2	.2	.1	92	103	97	118	92	102
LL07SH1	7	.4	.2	.1	97	97	116	119	98	103
LL14SH1	14	.5	.2	.4	93	101	117	124	94	112
LL28SH1	28	.6	.5	.6	102	101	114	128	71	104
LL99SH1	36	.9	.3	.1	*	*	*	*	*	*
LL56SH1	56	.8	.5	1.0	92	109	113	105	88	108
LL99SH2	108	1.4	.3	1.0	*	*	*	*	*	*
LL99SH3	241	.8	.2	.1	*	*	*	*	*	*
LL99SH4	372	.9	.3	.3	*	*	*	*	*	*
LL99SH5	492	.5	.3	.1	*	*	*	*	*	*
LL99SH6	606	.6	.2	.1	97	*	107	*	*	*
				SODIUM CHLORIDE 10.0% 50°C						
LH01SM1	1	1.8	*	.9	91	100	110	112	83	104
LH07SM1	7	3.4	1.3	3.3	93	104	104	107	99	112
LH14SM1	15	.8	1.1	2.7	94	99	107	100	87	104
LH28SM1	28	3.7	2.2	3.3	94	104	85	94	83	93

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
SODIUM CHLORIDE 10.0% 50°C									
LH99SM1 36	2.7	1.2	2.5	*	*	*	*	*	*
LH56SM1 56	3.8	1.8	4.0	115	114	79	84	85	99
LH99SM2 120	3.0	1.4	3.1	*	*	*	*	*	*
LH99SM3 241	3.3	1.0	2.7	*	*	*	*	*	*
LH99SM4 372	3.2	2.2	3.5	*	*	*	*	*	*
LH99SM5 485	2.8	1.4	2.4	*	*	*	*	*	*
LH99SM6 609	3.0	1.2	2.0	121	*	66	*	*	*
SODIUM CHLORIDE 10.0% 23°C									
LL01SM1 1	.6	*	.4	90	97	113	115	79	104
LL07SM1 7	1.5	.3	.1	95	94	116	113	90	115
LL14SM1 15	1.7	1.2	1.8	93	99	112	113	95	111
LL28SM1 28	3.0	9.9	10.8	104	90	88	111	78	94
LL99SM1 36	2.3	.8	2.6	*	*	*	*	*	*
LL56SM1 56	3.2	1.1	3.3	104	112	77	81	85	101
LL99SM2 107	2.5	.5	5.0	*	*	*	*	*	*
LL99SM3 241	2.7	.7	2.8	*	*	*	*	*	*
LL99SM4 372	2.6	.3	2.1	*	*	*	*	*	*
LL99SM5 485	2.2	.8	2.6	*	*	*	*	*	*
LL99SM6 606	2.3	.5	2.1	96	*	88	*	*	*
WATER 100.0% 50°C									
LH01WP1 1	2.9	1.4	3.1	93	115	109	89	85	100
LH07WP1 7	6.3	3.5	8.9	104	114	80	92	67	83
LH14WP1 14	8.5	5.0	11.4	96	100	94	113	81	86
LH28WP1 28	9.9	4.1	11.6	104	112	83	90	76	91
LH99WP1 36	13.2	7.0	18.4	*	*	*	*	*	*
LH56WP1 55	13.2	7.0	19.7	110	123	80	85	85	101
LH99WP2 120	16.7	8.9	23.1	*	*	*	*	*	*
LH99WP3 241	17.6	9.5	25.4	*	*	*	*	*	*
LH99WP4 364	18.5	9.7	25.2	*	*	*	*	*	*
LH99WP5 483	18.7	9.8	19.5	*	*	*	*	*	*
LH99WP6 609	18.9	9.4	25.1	120	*	71	*	*	*
WATER 100.0% 23°C									
LL01WP1 1	1.0	*	.5	105	115	82	91	79	93
LL07WP1 7	2.4	1.4	3.0	106	111	87	82	81	106
LL14WP1 14	3.4	2.1	3.7	96	103	111	116	93	105
LL28WP1 28	4.9	2.1	4.9	94	114	102	93	87	100
LL99WP1 36	4.9	2.2	5.8	*	*	*	*	*	*
LL56WP1 55	5.4	2.9	6.9	118	119	83	86	100	104
LL99WP2 108	6.8	4.3	10.6	*	*	*	*	*	*
LL99WP3 241	9.5	5.7	13.8	*	*	*	*	*	*

EPICHLOROHYDRIN: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				WATER 100.0% 23°C						
LL99WP4	364	11.3	5.8	15.3	*	*	*	*	*	*
LL99WP5	483	12.5	6.5	16.9	*	*	*	*	*	*
LL99WP6	606	13.3	7.0	18.5	96	*	80	*	*	*
				POTASSIUM DICHROMATE 10.0% 50°C						
LH01XM1	1	2.2	1.6	3.2	98	109	122	122	91	105
LH07XM1	7	4.2	2.6	5.6	98	101	123	119	86	104
LH14XM1	14	5.2	3.2	7.1	106	106	115	112	95	119
LH28XM1	28	5.0	2.6	6.2	112	105	111	117	101	100
LH99XM1	39	7.7	4.6	10.9	*	*	*	*	*	*
LH56XM1	56	8.0	4.8	11.2	104	108	88	92	80	90
LH99XM2	120	8.7	5.1	11.7	*	*	*	*	*	*
LH99XM3	247	9.0	4.9	11.8	*	*	*	*	*	*
LH99XM4	373	9.3	5.1	11.3	*	*	*	*	*	*
LH99XM5	493	8.6	4.9	10.8	*	*	*	*	*	*
LH99XM6	609	9.5	4.8	10.8	126	*	73	*	*	*
				POTASSIUM DICHROMATE 10.0% 23°C						
LL01XM1	1	.7	1.0	1.3	96	105	95	124	83	110
LL07XM1	7	1.7	.2	.9	91	105	115	122	88	101
LL14XM1	14	2.1	.8	2.3	98	112	118	96	95	115
LL28XM1	28	3.4	1.6	3.6	104	100	102	127	96	102
LL99XM1	39	4.0	1.4	4.8	*	*	*	*	*	*
LL56XM1	56	3.9	2.2	5.6	98	106	120	122	70	93
LL99XM2	107	5.5	2.4	7.0	*	*	*	*	*	*
LL99XM3	247	7.1	3.5	9.1	*	*	*	*	*	*
LL99XM4	373	7.7	3.7	9.5	*	*	*	*	*	*
LL99XM5	493	7.8	3.7	9.9	*	*	*	*	*	*
LL99XM6	606	8.5	4.5	10.9	107	*	77	*	*	*

HDPE : FINAL PROPERTIES

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				HYDROCHLORIC ACID 10.0% 50°C						
HH01AM1 1	1.44	31.90	3.00	1.00	159.28	174.32	686.64	630.40	26.64	32.61
HH01AM2 1	1.34	30.50	3.00	1.00	*	*	*	*	*	*
HH07AM2 7	1.37	31.30	3.00	0.98	*	*	*	*	*	*
HH07AM1 7	1.41	31.90	3.01	1.00	158.32	163.44	659.84	625.52	29.90	31.20
HH14AM1 14	1.56	34.70	3.00	0.99	144.08	140.88	641.44	571.52	25.90	24.62
HH14AM2 14	1.55	35.40	3.00	0.99	*	*	*	*	*	*
HH99AM1 28	1.44	32.00	3.01	0.99	*	*	*	*	*	*
HH28AM1 29	1.54	34.20	3.00	1.00	138.96	161.04	612.48	583.36	25.88	28.94
HH28AM2 29	*	*	*	*	*	*	*	*	*	*
HH56AM1 56	25.18	32.10	7.47	6.99	152.40	151.92	673.04	603.52	30.10	29.70
HH56AM2 56	1.58	34.60	3.01	1.00	*	*	*	*	*	*
HH99AM2 144	1.45	30.90	3.01	0.99	*	*	*	*	*	*
HH99AM3 252	1.44	31.10	3.01	0.99	*	*	*	*	*	*
HH99AM4 368	1.44	32.70	3.01	1.00	*	*	*	*	*	*
HH99AM5 511	1.44	31.20	3.01	0.99	*	*	*	*	*	*
HH99AM6 621	1.44	31.50	2.68	1.00	*	*	*	*	*	*
HH99AM7 770	1.44	30.80	3.01	0.99	96.25	*	1563.50	*	*	*
				HYDROCHLORIC ACID 10.0% 23°C						
HL01AM2 1	1.33	30.20	3.00	1.00	*	*	*	*	*	*
HL01AM1 1	1.57	35.30	3.00	1.00	160.88	168.88	642.24	611.92	32.44	27.40
HL07AM2 7	1.33	30.20	3.01	1.00	*	*	*	*	*	*
HL07AM1 7	1.40	31.80	3.00	1.00	135.92	146.96	670.64	600.48	26.54	28.06
HL14AM2 14	1.33	30.00	3.01	1.00	*	*	*	*	*	*
HL14AM1 14	1.34	30.50	3.01	1.00	166.64	172.40	664.64	629.52	32.10	32.94
HL99AM1 28	1.38	30.10	3.00	1.00	*	*	*	*	*	*
HL28AM1 29	1.56	34.70	3.00	1.00	151.28	155.60	668.48	582.40	28.78	30.90
HL28AM2 29	*	*	*	*	*	*	*	*	*	*
HL56AM2 56	1.57	34.80	3.00	1.00	*	*	*	*	*	*
HL56AM1 56	25.21	32.30	7.43	6.90	157.52	165.52	698.24	655.12	30.70	30.50
HL99AM2 144	1.38	29.80	3.00	1.00	*	*	*	*	*	*
HL99AM3 238	1.38	30.50	3.01	1.00	*	*	*	*	*	*
HL99AM4 368	1.39	30.90	3.00	1.00	*	*	*	*	*	*
HL99AM5 511	1.38	29.60	3.01	1.00	*	*	*	*	*	*
HL99AM6 621	1.38	30.50	3.01	1.00	*	*	*	*	*	*
HL99AM7 768	1.38	30.30	3.01	1.00	116.33	*	1791.58	*	*	*
				SODIUM HYDROXIDE 10.0% 50°C						
HH01BM1 1	1.48	32.60	3.01	1.00	163.68	190.30	611.93	644.96	25.48	30.16
HH07BM1 7	1.35	29.90	3.00	1.00	145.81	169.58	617.04	637.12	29.07	28.04
HH14BM1 13	1.58	34.90	3.01	1.00	143.30	141.61	635.44	580.88	26.68	26.04
HH28BM1 28	1.38	30.60	3.01	1.00	160.07	165.38	634.80	608.80	23.48	26.18
HH99BM1 29	1.38	30.30	3.00	1.00	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
HH56BM1	56	1.45	32.20	3.00	1.00	157.37	165.32	694.72	619.44	29.55	30.52
HH99BM2	144	1.39	29.90	3.01	1.00	*	*	*	*	*	*
HH99BM3	252	1.39	30.40	3.01	1.00	*	*	*	*	*	*
HH99BM4	368	1.38	30.40	3.00	*	*	*	*	*	*	*
HH99BM5	510	1.38	29.90	3.01	0.99	*	*	*	*	*	*
HH99BM6	622	1.38	37.40	3.01	1.00	*	*	*	*	*	*
HH99BM7	770	1.38	29.40	3.01	1.00	119.25	*	1818.83	*	*	*
SODIUM HYDROXIDE 10.0% 23°C											
HL01BM1	1	1.45	32.10	2.98	1.00	131.38	166.20	602.60	643.04	24.54	26.41
HL07BM1	7	1.51	33.40	3.00	1.00	138.89	167.78	592.16	627.44	30.22	31.38
HL14BM1	14	1.54	33.80	3.00	1.00	130.62	154.26	607.52	574.08	26.97	26.63
HL28BM1	28	1.45	32.40	3.01	1.00	148.89	159.18	640.64	624.64	27.41	27.08
HL99BM1	28	1.40	30.60	3.00	1.00	*	*	*	*	*	*
HL56BM1	56	1.56	34.50	3.00	1.00	165.93	140.38	680.56	574.96	28.33	30.13
HL99BM2	144	1.41	30.40	3.00	1.00	*	*	*	*	*	*
HL99BM3	238	1.40	31.20	3.01	1.00	*	*	*	*	*	*
HL99BM4	368	1.42	31.50	3.00	1.00	*	*	*	*	*	*
HL99BM5	510	1.41	30.40	3.01	1.00	*	*	*	*	*	*
HL99BM6	622	1.41	32.50	3.01	1.00	*	*	*	*	*	*
HL99BM7	768	1.41	29.70	3.00	1.00	113.58	*	1738.00	*	*	*
1 2 DICHLOROETHANE .8% 50°C											
HH01DH1	1	1.68	35.60	3.03	1.01	133.56	138.56	630.24	600.32	24.27	23.71
HH07DH1	7	1.45	31.30	3.03	1.00	120.23	134.80	570.15	567.10	22.00	22.80
HH14DH1	14	1.50	32.50	3.03	1.00	122.00	139.50	571.00	579.00	23.20	23.50
HH28DH1	28	1.54	33.00	3.04	1.01	121.20	136.10	576.80	578.60	24.70	25.20
HH99DH1	28	1.43	30.80	3.01	1.00	*	*	*	*	*	*
HH56DH1	56	1.39	*	3.01	1.00	*	*	*	*	23.30	24.00
HH99DH2	133	1.42	30.60	3.01	0.99	*	*	*	*	*	*
HH99DH3	244	1.45	30.90	3.02	0.99	*	*	*	*	*	*
HH99DH4	364	1.42	31.20	3.01	1.00	*	*	*	*	*	*
HH99DH5	495	1.42	31.50	3.01	0.99	*	*	*	*	*	*
HH99DH6	629	1.42	32.40	3.01	0.99	*	*	*	*	*	*
HH99DH7	763	1.43	32.00	3.01	0.99	95.00	*	1565.00	*	*	*
1 2 DICHLOROETHANE .8% 23°C											
HL01DH1	1	1.45	31.10	3.03	1.01	128.76	140.56	629.04	597.96	23.90	24.04
HL07DH1	7	1.42	30.70	3.01	1.00	127.70	129.60	598.90	547.60	22.70	22.80
HL14DH1	14	1.60	34.10	3.03	1.01	129.20	130.40	607.30	557.90	23.30	24.10
HL99DH1	28	1.43	30.70	3.01	1.00	*	*	*	*	*	*
HL28DH1	28	1.61	35.00	3.03	1.01	128.10	136.^0jSSSSG				

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
1 2 DICHLOROETHANE .8% 23°C											
HL99DH4	364	1.43	31.00	3.02	1.00	*	*	*	*	*	*
HL99DH5	495	1.43	30.70	3.01	1.00	*	*	*	*	*	*
HL99DH6	630	1.43	31.90	3.02	0.99	*	*	*	*	*	*
HL99DH7	761	1.43	33.10	3.02	0.99	118.25	*	1785.13	*	*	*
1 2 DICHLOROETHANE .1% 50°C											
HH01DL1	1	1.35	30.00	3.01	1.00	131.32	139.92	642.60	612.20	23.55	23.96
HH07DL1	7	1.41	31.30	3.01	1.00	121.70	133.90	586.20	560.30	22.95	23.30
HH14DL1	14	1.39	30.50	3.01	1.00	127.70	139.50	604.00	579.00	23.50	23.90
HH99DL1	28	1.41	30.90	3.01	1.00	*	*	*	*	*	*
HH28DL1	28	1.41	30.90	3.01	1.00	126.20	138.40	600.60	569.10	25.70	26.50
HH56DL1	56	1.56	34.20	3.01	1.00	*	*	*	*	23.40	24.20
HH99DL2	139	1.41	30.50	3.01	1.00	*	*	*	*	*	*
HH99DL3	246	1.42	30.60	3.01	1.00	*	*	*	*	*	*
HH99DL4	370	1.40	30.60	3.01	0.99	*	*	*	*	*	*
HH99DL5	496	1.41	30.40	3.01	0.99	*	*	*	*	*	*
HH99DL6	631	1.41	31.80	3.01	0.99	*	*	*	*	*	*
HH99DL7	765	1.41	32.30	3.01	0.99	116.50	*	1870.00	*	*	*
1 2 DICHLOROETHANE .1% 23°C											
HL01DL1	1	1.36	30.40	3.01	1.00	133.56	142.30	625.90	612.52	23.63	24.60
HL07DL1	7	1.51	33.30	3.01	1.00	130.40	136.20	606.40	556.70	22.80	22.90
HL14DL1	14	1.68	34.70	3.01	1.00	132.00	136.40	611.60	562.40	23.40	24.10
HL99DL1	28	1.42	31.20	3.01	1.00	*	*	*	*	*	*
HL28DL1	28	1.46	32.30	3.01	1.00	130.50	134.30	620.00	566.00	25.70	26.50
HL56DL1	56	1.58	34.10	3.01	1.00	*	*	*	*	23.00	24.20
HL99DL2	136	1.43	30.30	3.00	1.00	*	*	*	*	*	*
HL99DL3	233	1.42	31.10	3.01	1.00	*	*	*	*	*	*
HL99DL4	366	1.42	30.50	3.00	1.00	*	*	*	*	*	*
HL99DL5	496	1.42	30.40	3.00	1.00	*	*	*	*	*	*
HL99DL6	632	1.42	31.50	3.01	1.00	*	*	*	*	*	*
HL99DL7	763	1.42	32.10	3.00	1.00	123.75	*	1861.75	*	*	*
1 2 DICHLOROETHANE .5% 50°C											
HH01DM1	1	1.44	31.10	3.01	1.00	129.72	141.84	632.56	601.74	24.25	24.40
HH07DM1	7	1.48	32.20	3.02	1.01	117.40	133.40	578.00	585.00	22.30	21.80
HH14DM1	14	1.60	35.20	3.03	1.01	129.10	135.90	599.80	571.10	23.30	23.20
HH28DM1	28	1.45	31.30	3.02	1.00	128.70	132.70	615.00	568.90	24.30	26.00
HH99DM1	28	1.48	31.90	3.01	1.00	*	*	*	*	*	*
HH56DM1	56	1.42	30.90	3.02	1.00	*	*	*	*	24.40	23.80
HH99DM3	245	1.54	32.20	3.02	1.00	*	*	*	*	*	*
HH99DM4	365	1.48	31.90	3.01	0.99	*	*	*	*	*	*
HH99DM5	496	1.48	32.10	3.01	0.99	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
			1 2 DICHLOROETHANE .5% 50°C							
HH99DM6 630	1.48	34.30	3.01	0.99	*	*	*	*	*	*
HH99DM7 764	1.48	33.80	3.01	0.99	100.25	*	1652.00	*	*	*
			1 2 DICHLOROETHANE .5% 23°C							
HL01DM1 1	1.41	31.00	3.02	1.00	142.78	143.70	663.10	598.06	24.44	24.70
HL07DM1 7	1.62	35.10	3.01	1.01	127.10	143.70	608.00	564.60	22.50	24.50
HL14DM1 14	1.45	31.30	3.01	1.00	132.10	134.00	618.00	566.00	24.50	24.80
HL28DM1 28	1.41	30.90	3.02	1.00	126.00	137.50	600.00	579.00	24.60	27.20
HL99DM1 28	1.43	31.10	3.00	0.99	*	*	*	*	*	*
HL56DM1 56	1.41	30.40	3.01	1.00	*	*	*	*	24.10	24.70
HL99DM2 135	1.44	31.10	3.01	0.99	*	*	*	*	*	*
HL99DM3 233	1.43	31.60	3.01	1.00	*	*	*	*	*	*
HL99DM4 365	1.43	31.80	3.01	1.00	*	*	*	*	*	*
HL99DM5 496	1.43	31.30	3.01	0.99	*	*	*	*	*	*
HL99DM6 631	1.43	32.50	3.01	0.99	*	*	*	*	*	*
HL99DM7 762	1.43	32.00	3.01	0.99	112.38	*	1741.38	*	*	*
			FURFURAL 8.0% 50°C							
HH01FH1 1	1.44	31.80	3.01	1.00	113.59	124.26	523.92	508.40	26.66	32.66
HH07FH1 7	1.57	34.20	3.03	1.00	120.50	128.30	587.00	546.00	23.28	24.48
HH14FH1 14	1.46	32.30	3.01	1.00	122.13	133.44	576.00	543.60	24.60	25.02
HH28FH1 28	1.48	32.20	3.01	1.00	131.47	145.00	576.70	556.00	24.42	24.90
HH99FH1 28	1.52	32.30	3.02	1.00	*	*	*	*	*	*
HH56FH1 56	1.43	30.40	2.99	1.00	128.27	143.28	501.30	519.20	25.00	25.20
HH99FH2 117	1.51	32.50	3.02	1.00	*	*	*	*	*	*
HH99FH3 236	1.51	32.50	3.02	1.00	*	*	*	*	*	*
HH99FH4 350	1.51	32.60	3.02	1.00	*	*	*	*	*	*
HH99FH5 485	1.51	33.50	3.02	1.00	*	*	*	*	*	*
HH99FH6 616	1.58	35.40	3.03	1.00	*	*	*	*	*	*
HH99FH7 750	1.51	34.70	3.02	0.99	100.75	*	1590.50	*	*	*
			FURFURAL 8.0% 23°C							
HL01FH1 1	1.48	32.50	3.00	1.00	121.34	121.03	550.16	496.24	27.56	31.20
HL07FH1 7	1.36	29.90	3.01	1.00	119.80	128.80	552.00	535.00	25.20	26.00
HL14FH1 14	1.46	32.50	3.01	1.00	127.47	135.04	592.00	542.40	23.94	24.82
HL99FH1 28	1.46	31.10	3.01	1.00	*	*	*	*	*	*
HL28FH1 28	1.62	35.40	3.01	1.00	139.90	133.50	631.00	522.00	22.86	24.12
HL56FH1 56	1.41	31.00	3.00	1.00	129.07	134.00	526.70	543.50	25.04	25.54
HL99FH2 117	1.46	31.30	3.01	1.00	*	*	*	*	*	*
HL99FH3 219	1.46	32.10	3.02	1.01	*	*	*	*	*	*
HL99FH4 350	1.46	31.90	3.01	1.00	*	*	*	*	*	*
HL99FH5 485	1.50	32.40	3.02	1.01	*	*	*	*	*	*
HL99FH6 617	1.48	33.20	3.02	1.01	*	*	*	*	*	*
HL99FH7 748	1.47	36.30	3.01	1.00	83.70	*	1313.25	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 1.0% 50°C										
HH01FL1 1	1.37	29.90	3.01	1.00	143.00	120.25	519.52	491.84	27.76	33.92
HH07FL1 7	1.42	31.60	3.01	1.00	119.33	125.50	561.30	550.00	24.14	24.10
HH14FL1 14	1.56	34.20	3.01	1.00	120.48	124.80	576.80	534.80	27.76	27.36
HH28FL1 28	1.62	36.20	3.01	1.00	119.50	140.48	493.20	513.20	26.73	26.49
HH99FL1 29	1.51	32.80	3.01	1.00	*	*	*	*	*	*
HH56FL1 56	1.53	33.80	3.01	1.00	136.00	144.32	536.00	531.20	25.36	24.68
HH99FL2 124	1.51	32.70	3.01	1.00	*	*	*	*	*	*
HH99FL3 242	1.53	32.70	3.01	1.00	*	*	*	*	*	*
HH99FL4 356	1.51	32.70	3.01	1.00	*	*	*	*	*	*
HH99FL5 489	1.52	32.70	3.01	0.99	*	*	*	*	*	*
HH99FL6 622	1.53	34.00	3.02	1.00	*	*	*	*	*	*
HH99FL7 756	1.52	31.80	3.01	1.00	100.00	*	1563.00	*	*	*
FURFURAL 1.0% 23°C										
HL01FL1 1	1.39	30.20	3.00	1.00	108.39	117.56	487.36	485.76	31.98	33.04
HL07FL1 7	1.58	35.40	3.01	1.01	118.93	130.30	559.30	536.50	24.04	25.26
HL14FL1 14	1.56	34.30	3.01	1.00	114.50	124.40	552.00	535.60	26.24	28.50
HL28FL1 28	1.58	34.80	3.01	1.00	*	*	*	*	25.53	24.88
HL28FL2 28	1.39	30.90	3.00	1.00	130.60	138.93	590.00	558.70	25.20	25.78
HL99FL1 29	1.50	33.10	3.01	1.00	*	*	*	*	*	*
HL56FL1 56	1.52	33.80	3.01	1.00	132.40	135.44	597.00	508.40	25.74	27.76
HL99FL2 124	1.49	32.10	3.01	1.00	*	*	*	*	*	*
HL99FL3 225	1.49	33.50	3.01	1.01	*	*	*	*	*	*
HL99FL4 356	1.50	32.50	3.00	1.00	*	*	*	*	*	*
HL99FL5 489	1.50	32.30	3.00	1.00	*	*	*	*	*	*
HL99FL6 623	1.50	32.80	3.01	1.00	*	*	*	*	*	*
HL99FL7 754	1.50	33.90	3.01	1.00	114.50	*	1701.67	*	*	*
FURFURAL 4.0% 50°C										
HH01FM1 1	1.60	34.80	3.01	1.00	115.16	118.84	520.00	491.92	31.94	31.42
HH07FM1 7	1.44	31.40	3.02	1.00	120.40	131.30	558.70	531.00	24.14	24.26
HH14FM1 14	1.41	30.80	3.01	1.00	119.50	133.30	578.50	556.50	24.26	24.00
HH28FM1 28	1.61	35.50	3.01	1.00	123.50	134.40	697.30	658.70	23.32	23.26
HH99FM1 29	1.44	30.80	3.02	1.00	*	*	*	*	*	*
HH56FM1 56	1.57	34.20	3.01	1.00	130.00	146.00	569.30	582.40	25.70	26.20
HH99FM2 124	1.40	30.90	3.02	1.00	*	*	*	*	*	*
HH99FM3 242	1.44	31.20	3.03	1.00	*	*	*	*	*	*
HH99FM4 356	1.44	31.00	3.02	1.00	*	*	*	*	*	*
HH99FM5 490	1.45	31.50	3.03	1.00	*	*	*	*	*	*
HH99FM6 622	1.49	33.30	3.03	1.00	*	*	*	*	*	*
HH99FM7 756	1.44	30.80	3.02	1.00	86.67	*	1418.67	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 4.0% 23°C										
HL01FM1 1	1.51	33.40	3.01	1.00	109.62	122.22	512.00	504.72	31.00	32.08
HL07FM1 7	1.47	32.30	3.02	1.01	120.30	130.24	630.50	551.20	24.06	25.10
HL14FM1 14	1.55	33.80	3.01	1.00	128.67	138.67	605.30	519.30	24.70	24.94
HL28FM1 28	1.39	30.30	3.01	1.00	118.90	134.96	666.00	621.60	22.96	22.78
HL99FM1 29	1.52	32.90	3.01	1.00	*	*	*	*	*	*
HL56FM1 56	1.58	34.40	3.01	1.00	128.00	141.60	662.70	625.60	23.62	24.72
HL99FM2 124	1.52	32.30	3.01	1.00	*	*	*	*	*	*
HL99FM3 228	1.52	33.40	3.02	1.01	*	*	*	*	*	*
HL99FM4 356	1.52	32.50	3.01	1.00	*	*	*	*	*	*
HL99FM5 490	1.52	33.10	3.01	1.01	*	*	*	*	*	*
HL99FM6 623	1.53	33.60	3.11	1.05	*	*	*	*	*	*
HL99FM7 754	1.53	35.20	3.01	1.00	86.08	*	1334.00	*	*	*
METHYL ETHYL KETONE 26.0% 50°C										
HH01MH1 1	1.55	34.20	3.04	1.01	137.68	148.72	636.08	608.40	25.26	26.10
HH07MH1 7	1.57	34.00	3.04	1.01	154.14	151.77	676.64	602.24	25.37	26.64
HH14MH1 14	1.40	31.40	3.04	1.01	131.66	158.50	578.16	621.28	24.70	25.28
HH28MH1 28	1.54	33.40	3.03	1.01	137.06	149.32	631.90	605.04	25.37	25.64
HH99MH1 29	1.45	31.00	3.03	1.00	*	*	*	*	*	*
HH56MH1 57	1.46	32.10	3.02	1.00	138.58	156.26	647.20	656.00	24.94	24.58
HH99MH2 122	1.45	30.70	3.04	1.00	*	*	*	*	*	*
HH99MH3 240	1.45	31.20	3.04	1.00	*	*	*	*	*	*
HH99MH4 358	1.45	30.80	3.04	1.00	*	*	*	*	*	*
HH99MH5 493	1.44	31.00	3.03	0.99	*	*	*	*	*	*
HH99MH6 626	1.43	32.00	3.03	0.99	*	*	*	*	*	*
HH99MH7 759	1.43	32.60	3.03	0.99	84.17	*	1237.00	*	*	*
METHYL ETHYL KETONE 26.0% 23°C										
HL01MH1 1	1.45	31.80	3.02	1.00	136.40	152.40	622.88	607.44	25.18	26.34
HL07MH1 7	1.54	33.70	3.03	1.01	149.99	149.00	658.88	586.32	25.37	25.99
HL14MH1 14	1.42	31.70	3.03	1.00	143.35	152.58	629.44	596.48	28.38	27.55
HL28MH1 28	1.56	34.40	3.01	1.00	147.94	149.19	660.24	600.96	25.44	26.69
HL99MH1 29	1.40	30.10	3.03	1.01	*	*	*	*	*	*
HL56MH1 57	1.40	31.40	3.00	1.00	178.47	145.34	580.00	586.16	24.98	25.24
HL99MH2 122	1.41	29.70	3.03	1.01	*	*	*	*	*	*
HL99MH3 235	1.40	30.30	3.03	1.01	*	*	*	*	*	*
HL99MH4 358	1.41	29.90	3.03	1.00	*	*	*	*	*	*
HL99MH5 493	1.40	29.90	3.02	1.00	*	*	*	*	*	*
HL99MH6 627	1.41	30.00	3.01	1.00	*	*	*	*	*	*
HL99MH7 757	1.40	30.30	3.03	1.00	91.75	*	1523.50	*	*	*
METHYL ETHYL KETONE 3.0% 50°C										
HH01ML1 1	1.52	33.30	3.01	1.00	142.64	138.48	652.48	588.72	24.90	25.18
HH07ML1 7	1.44	31.90	3.02	1.00	150.74	148.10	654.88	579.28	26.17	27.06

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 3.0% 50°C										
HH14ML1 14	1.60	35.70	3.01	1.00	142.68	160.94	634.80	624.48	25.51	25.24
HH28ML1 28	1.52	34.40	3.01	1.00	144.44	150.47	652.64	612.00	24.79	25.85
HH99ML1 28	1.54	33.20	3.01	1.00	*	*	*	*	*	*
HH56ML1 57	1.35	30.50	3.00	0.98	135.94	154.89	616.60	618.32	25.54	25.94
HH99ML2 120	1.55	33.10	3.01	1.00	*	*	*	*	*	*
HH99ML3 240	1.55	34.60	3.01	1.00	*	*	*	*	*	*
HH99ML4 358	1.54	33.10	3.01	0.99	*	*	*	*	*	*
HH99ML5 493	1.55	33.70	3.01	1.00	*	*	*	*	*	*
HH99ML6 626	1.53	34.10	3.01	0.99	*	*	*	*	*	*
HH99ML7 759	1.53	34.70	3.02	0.99	101.38	*	1525.13	*	*	*
METHYL ETHYL KETONE 3.0% 23°C										
HL01ML1 1	1.57	34.50	3.00	1.00	136.24	148.72	613.20	590.64	26.62	27.38
HL07ML1 7	1.54	33.90	3.01	1.00	147.90	165.30	636.40	643.68	25.85	26.44
HL14ML1 14	1.58	35.10	3.01	1.01	141.37	151.98	641.04	602.32	25.09	26.46
HL28ML1 28	1.41	31.30	3.00	1.00	147.16	160.38	640.80	620.16	27.85	28.94
HL99ML1 28	1.42	30.90	3.00	1.00	*	*	*	*	*	*
HL56ML1 57	1.48	33.00	3.00	1.00	146.94	153.13	665.84	611.52	25.81	25.63
HL99ML2 120	1.43	30.60	3.01	1.00	*	*	*	*	*	*
HL99ML3 235	1.42	31.20	3.01	1.00	*	*	*	*	*	*
HL99ML4 358	1.43	30.70	3.01	1.00	*	*	*	*	*	*
HL99ML5 494	1.43	31.00	3.01	1.00	*	*	*	*	*	*
HL99ML6 627	1.42	30.80	3.01	1.00	*	*	*	*	*	*
HL99ML7 757	1.42	31.10	3.01	1.00	126.25	*	1841.83	*	*	*
METHYL ETHYL KETONE 13.0% 50°C										
HH01MM1 1	1.40	31.10	3.03	0.99	136.40	142.96	607.76	576.08	24.54	25.10
HH07MM1 7	1.58	34.70	3.00	1.00	153.85	143.83	676.08	560.72	26.70	26.95
HH14MM1 14	1.52	33.50	3.02	1.01	148.17	144.95	661.60	589.92	26.42	26.99
HH99MM1 28	1.54	33.10	3.01	1.00	*	*	*	*	*	*
HH28MM1 28	1.45	31.50	3.01	1.00	135.83	152.79	615.76	612.32	26.25	28.10
HH56MM1 57	1.36	30.10	3.01	1.00	136.62	150.73	646.16	621.76	25.14	25.64
HH99MM2 120	1.42	30.00	3.03	1.00	*	*	*	*	*	*
HH99MM3 239	1.40	30.50	3.03	1.00	*	*	*	*	*	*
HH99MM4 357	1.40	29.90	3.03	1.00	*	*	*	*	*	*
HH99MM5 493	1.40	30.10	3.02	0.99	*	*	*	*	*	*
HH99MM6 625	1.39	31.40	3.02	0.99	*	*	*	*	*	*
HH99MM7 758	1.39	30.90	3.02	0.99	89.08	*	1508.33	*	*	*
METHYL ETHYL KETONE 13.0% 23°C										
HL01MM1 1	1.51	32.90	3.01	1.00	140.56	145.20	652.48	601.76	24.66	25.10
HL07MM1 7 ^OjSSSSJ										

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 13.0% 23°C										
HL99MM1 28	1.42	30.00	3.02	1.00	*	*	*	*	*	*
HL56MM1 57	1.37	30.50	3.00	1.00	143.99	162.30	643.44	638.00	25.15	25.00
HL99MM2 120	1.43	30.40	3.02	1.00	*	*	*	*	*	*
HL99MM3 234	1.41	31.20	3.02	1.01	*	*	*	*	*	*
HL99MM4 357	1.41	30.40	3.01	1.00	*	*	*	*	*	*
HL99MM5 493	1.42	30.30	3.01	1.00	*	*	*	*	*	*
HL99MM6 626	1.42	30.70	3.01	1.67	*	*	*	*	*	*
HL99MM7 756	1.41	30.70	3.02	1.00	92.60	*	1490.25	*	*	*
ASTM #2 OIL SATURATED 50°C										
HH010M1 1	1.53	33.40	3.01	1.01	142.16	146.00	619.60	570.88	25.45	25.80
HH070M1 7	1.38	30.10	3.01	1.00	139.92	150.48	636.32	611.20	24.98	26.08
HH140M1 13	1.60	36.00	3.02	1.00	129.04	139.12	588.96	571.92	25.73	26.91
HH280M1 28	1.46	31.60	3.02	1.00	148.76	156.15	640.32	623.50	25.92	26.80
HH990M1 28	1.47	31.00	3.04	1.00	107.67	*	1650.00	*	*	*
HH560M1 56	1.35	29.70	3.02	1.00	147.60	151.12	647.36	595.20	25.87	25.92
HH990M2 128	1.48	*	3.07	1.01	*	*	*	*	*	*
HH990M3 251	1.50	30.80	3.08	1.00	*	*	*	*	*	*
HH990M4 364	1.49	30.50	3.08	1.01	*	*	*	*	*	*
HH990M5 503	1.50	30.80	3.08	1.00	*	*	*	*	*	*
HH990M6 626	1.49	31.70	3.09	1.01	*	*	*	*	*	*
HH990M7 765	1.50	31.00	3.08	1.01	107.67	*	1650.00	*	*	*
ASTM #2 OIL SATURATED 23°C										
HL010M1 1	1.56	34.30	3.01	1.00	143.60	146.32	648.00	591.36	25.20	25.71
HL070M1 7	1.46	31.70	3.00	1.00	139.92	146.16	651.04	604.72	25.83	25.55
HL140M1 13	1.57	34.60	3.01	1.00	136.24	119.70	626.72	483.30	26.00	25.39
HL990M1 28	1.44	31.50	3.00	1.00	*	*	*	*	*	*
HL280M1 28	1.53	33.10	3.01	1.01	144.50	160.31	677.52	681.12	24.80	25.50
HL560M1 56	1.41	30.90	3.01	1.00	160.40	167.28	685.92	622.16	28.39	25.37
HL990M2 128	1.45	31.30	3.01	1.01	*	*	*	*	*	*
HL990M3 237	1.44	31.70	3.02	1.01	*	*	*	*	*	*
HL990M4 364	1.45	31.40	3.01	1.01	*	*	*	*	*	*
HL990M5 503	1.46	31.20	3.02	1.00	*	*	*	*	*	*
HL990M6 626	1.46	31.80	3.03	1.01	*	*	*	*	*	*
HL990M7 763	1.47	34.10	3.04	1.00	112.25	*	1769.00	*	*	*
ASTM #2 OIL 100.0% 50°C										
HH010P1 1	1.48	32.90	3.02	1.01	128.56	138.00	614.32	595.04	24.82	24.78
HH070P1 7	1.39	30.00	3.05	1.01	144.10	*	663.92	*	23.80	23.00
HH140P1 14	1.53	32.50	3.06	1.01	136.10	150.71	630.80	627.84	22.70	22.70
HH280P1 28	1.41	29.80	3.09	1.01	137.20	146.16	626.10	604.48	23.01	23.55
HH990P1 28	1.57	32.50	3.08	1.01	*	*	*	*	*	*
HH560P1 56	1.53	32.10	3.08	1.01	139.44	143.36	615.52	607.68	24.23	25.34

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
			ASTM #2 OIL	100.0%	50°C					
HH990P2 141	1.58	32.50	3.09	1.01	*	*	*	*	*	*
HH990P3 257	1.59	32.60	3.09	1.01	*	*	*	*	*	*
HH990P4 385	1.58	32.60	3.12	1.01	*	*	*	*	*	*
HH990P5 509	1.59	33.00	3.10	1.00	*	*	*	*	*	*
HH990P6 627	1.59	33.50	3.20	1.01	*	*	*	*	*	*
HH990P7 771	1.58	32.80	3.09	1.01	113.00	*	1700.00	*	*	*
			ASTM #2 OIL	100.0%	23°C					
HL010P1 1	1.37	29.70	3.01	1.00	126.16	146.80	597.36	617.52	24.81	25.97
HL070P1 7	1.37	30.40	3.01	1.00	147.02	164.38	670.00	654.64	25.30	26.10
HL140P1 14	1.44	32.20	3.01	0.99	138.06	141.51	632.64	585.68	23.50	23.70
HL990P1 28	1.51	32.60	3.01	1.00	*	*	*	*	*	*
HL280P1 28	1.60	35.10	3.01	1.00	142.64	158.16	667.44	629.36	*	24.93
HL560P1 56	1.51	33.10	3.01	1.00	142.56	140.24	648.40	576.48	24.90	25.98
HL990P2 141	1.53	32.40	3.02	1.00	*	*	*	*	*	*
HL990P3 244	1.53	34.10	3.03	1.01	*	*	*	*	*	*
HL990P4 385	1.54	32.50	3.03	1.00	*	*	*	*	*	*
HL990P5 509	1.56	32.90	3.04	1.00	*	*	*	*	*	*
HL990P6 627	1.56	33.30	3.05	1.01	*	*	*	*	*	*
HL990P7 769	1.56	34.40	3.05	1.01	104.58	*	1663.58	*	*	*
			PHENOL	8.0%	50°C					
HH01PH1 1	1.55	33.80	3.01	1.00	136.12	140.30	633.88	584.40	23.90	24.60
HH07PH1 7	1.51	32.90	3.01	1.00	131.82	124.60	623.80	539.70	24.39	24.05
HH14PH1 14	1.38	30.60	3.01	1.00	127.58	128.46	612.10	564.24	24.19	24.78
HH28PH1 28	1.37	29.90	3.01	1.00	130.08	138.14	609.24	581.90	24.39	24.47
HH99PH1 29	1.45	31.10	3.02	1.00	*	*	*	*	*	*
HH56PH1 56	1.53	33.50	3.01	1.00	133.76	128.54	631.26	565.76	22.48	22.98
HH99PH2 121	1.46	30.90	3.02	1.00	*	*	*	*	*	*
HH99PH3 243	1.45	31.10	3.03	1.00	*	*	*	*	*	*
HH99PH4 362	1.45	31.10	3.02	1.00	*	*	*	*	*	*
HH99PH5 499	1.44	31.10	3.02	1.00	*	*	*	*	*	*
HH99PH6 624	1.44	31.60	3.02	0.99	*	*	*	*	*	*
HH99PH7 757	1.44	31.90	3.02	0.99	117.00	*	1722.38	*	*	*
			PHENOL	8.0%	23°C					
HL01PH1 1	1.42	30.90	3.00	*	129.46	134.08	615.56	579.34	24.42	25.03
HL07PH1 7	1.41	31.20	3.00	1.00	131.58	128.92	634.46	570.82	23.86	24.65
HL14PH1 14	1.40	29.90	3.01	1.00	126.14	135.04	606.06	574.22	24.49	26.09
HL28PH1 28	1.35	30.00	3.01	1.00	133.54	140.08	625.42	587.56	24.57	24.06
HL99PH1 29	1.46	31.60	3.00	1.00	*	*	*	*	*	*
HL56PH1 56	1.36	30.00	3.01	1.00	132.96	138.96	621.00	585.22	23.30	24.84
HL99PH2 121	1.46	31.50	3.01	1.00	*	*	*	*	*	*
HL99PH3 230	1.46	32.40	3.01	1.01	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 8.0% 23°C										
HL99PH4 362	1.45	31.70	3.01	1.00	*	*	*	*	*	*
HL99PH5 499	1.46	31.40	3.01	1.00	*	*	*	*	*	*
HL99PH6 625	1.46	30.70	3.01	1.00	*	*	*	*	*	*
HL99PH7 755	1.47	33.90	3.01	1.00	107.17	*	1685.75	*	*	*
PHENOL 1.0% 50°C										
HH99PL4 1	*	*	*	*	*	*	*	*	*	*
HH01PL1 1	1.46	31.80	3.00	1.00	129.10	140.48	610.18	576.00	24.89	24.80
HH07PL1 7	1.35	29.70	3.00	1.00	132.38	140.14	627.58	591.00	24.20	26.30
HH14PL1 14	1.49	32.20	3.01	1.00	129.44	137.74	616.92	592.52	24.56	25.20
HH28PL1 28	1.33	29.20	3.01	0.99	131.46	140.28	609.00	582.78	24.60	25.73
HH99PL1 28	1.41	30.40	3.01	1.00	*	*	*	*	*	*
HH56PL1 56	1.60	35.80	3.01	1.00	124.08	138.50	582.02	583.40	24.04	23.70
HH99PL2 122	1.41	30.50	3.01	1.00	*	*	*	*	*	*
HH99PL3 245	1.42	30.60	3.01	1.00	*	*	*	*	*	*
HH99PL5 499	1.41	30.50	3.02	0.99	*	*	*	*	*	*
HH99PL6 625	1.41	32.00	3.02	1.00	*	*	*	*	*	*
HH99PL7 758	1.41	32.70	3.01	0.99	97.38	*	1460.38	*	*	*
PHENOL 1.0% 23°C										
HL01PL1 1	1.44	32.00	3.00	1.00	129.60	139.42	552.50	515.40	24.37	24.39
HL07PL1 7	1.54	36.10	3.00	1.01	121.14	139.60	581.98	578.00	25.03	26.39
HL14PL1 14	1.33	29.30	3.01	1.00	128.66	139.64	613.76	586.04	24.33	25.09
HL28PL1 28	1.56	34.40	3.01	1.00	130.55	137.28	620.47	566.04	24.74	25.90
HL99PL1 28	1.42	30.40	3.00	1.00	*	*	*	*	*	*
HL56PL1 56	1.42	31.40	3.01	1.00	134.84	140.48	619.00	578.90	25.15	24.68
HL99PL2 122	1.42	30.70	3.01	1.00	*	*	*	*	*	*
HL99PL3 233	1.42	31.10	3.01	1.00	*	*	*	*	*	*
HL99PL4 363	1.43	30.70	3.01	1.00	*	*	*	*	*	*
HL99PL5 499	1.42	30.50	3.01	1.00	*	*	*	*	*	*
HL99PL6 626	1.42	31.70	3.01	1.00	*	*	*	*	*	*
HL99PL7 756	1.42	31.70	3.01	1.00	97.75	*	1557.42	*	*	*
PHENOL 4.0% 50°C										
HH01PM1 1	1.41	31.20	3.00	1.00	138.04	127.64	569.52	610.40	24.02	23.77
HH07PM1 7	1.45	32.10	3.01	1.00	135.56	140.56	621.80	585.28	24.91	25.84
HH14PM1 14	1.49	32.40	3.01	1.00	130.50	139.64	600.36	569.98	24.94	*
HH28PM1 28	1.34	29.40	3.01	1.00	132.40	134.12	614.04	563.34	24.42	24.24
HH99PM1 29	1.52	32.30	3.02	1.00	*	*	*	*	*	*
HH56PM1 56	1.36	29.80	3.01	1.00	134.20	141.58	632.82	586.34	23.47	24.50
HH99PM2 121	1.53	32.40	3.02	1.00	*	*	*	*	*	*
HH99PM3 244	1.50	32.50	3.03	1.00	*	*	*	*	*	*
HH99PM4 362	1.52	32.60	3.02	1.00	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 4.0% 50°C										
HH99PM5 499	1.53	33.30	3.03	1.00	*	*	*	*	*	*
HH99PM6 624	1.52	33.90	3.03	1.00	*	*	*	*	*	*
HH99PM7 757	1.53	35.20	3.03	1.00	82.50	*	1306.58	*	*	*
PHENOL 4.0% 23°C										
HL01PM1 1	1.47	32.40	3.00	1.00	130.04	128.02	622.06	555.56	22.99	24.10
HL07PM1 7	1.44	31.70	3.01	1.00	119.78	138.62	567.40	589.72	24.45	24.80
HL14PM1 14	1.35	29.90	3.01	1.00	125.74	139.84	607.18	582.40	25.11	25.36
HL28PM1 28	1.47	31.90	3.01	1.00	127.10	133.00	605.00	567.00	24.20	24.83
HL99PM1 29	1.46	31.20	3.01	1.00	*	*	*	*	*	*
HL56PM1 56	1.34	29.70	3.01	1.00	130.48	141.10	631.92	602.02	24.56	24.30
HL99PM2 121	1.47	31.40	3.00	1.00	*	*	*	*	*	*
HL99PM3 231	1.46	32.00	3.01	1.01	*	*	*	*	*	*
HL99PM4 362	1.46	31.60	3.01	1.00	*	*	*	*	*	*
HL99PM5 499	1.47	31.20	3.01	1.00	*	*	*	*	*	*
HL99PM6 625	1.46	32.20	3.02	1.00	*	*	*	*	*	*
HL99PM7 755	1.47	32.20	3.02	1.00	114.25	*	1683.50	*	*	*
SODIUM CHLORIDE 35.0% 50°C										
HH01SH1 1	1.51	32.90	3.01	1.00	145.99	151.30	586.56	671.52	24.24	25.24
HH07SH1 7	1.50	32.90	3.01	1.00	135.18	150.86	606.88	646.40	24.60	25.33
HH14SH1 14	1.53	33.90	3.00	1.00	141.74	164.28	655.92	630.11	27.26	27.12
HH99SH1 28	1.52	33.10	3.01	1.00	*	*	*	*	*	*
HH28SH1 28	1.44	32.30	3.01	1.00	156.49	171.72	636.32	606.70	27.70	25.32
HH56SH1 56	1.32	29.70	3.02	1.00	149.14	147.02	673.20	597.04	27.00	27.79
HH99SH2 131	1.51	32.50	3.01	1.00	*	*	*	*	*	*
HH99SH3 253	1.53	32.70	3.01	1.00	*	*	*	*	*	*
HH99SH4 379	1.51	33.40	3.01	1.00	*	*	*	*	*	*
HH99SH5 510	1.52	32.80	3.01	0.99	*	*	*	*	*	*
HH99SH6 630	1.51	35.20	3.02	1.00	*	*	*	*	*	*
HH99SH7 771	1.51	31.20	3.01	0.99	98.00	*	1597.50	*	*	*
SODIUM CHLORIDE 35.0% 23°C										
HL01SH1 1	1.38	30.50	3.01	1.00	141.96	155.98	652.64	633.44	24.89	26.31
HL07SH1 7	1.44	31.80	3.00	1.00	134.68	134.12	598.24	615.20	24.87	26.95
HL14SH1 14	1.53	34.40	3.01	1.00	141.62	151.67	654.72	628.11	24.72	28.42
HL28SH1 28	1.37	30.70	3.00	1.00	145.13	162.86	656.67	614.40	23.93	26.84
HL99SH1 28	1.55	34.70	3.00	1.00	*	*	*	*	*	*
HL56SH1 56	1.32	29.50	3.00	1.00	140.76	151.24	664.80	619.68	25.18	26.45
HL99SH2 131	1.54	33.20	3.01	1.00	*	*	*	*	*	*
HL99SH3 246	1.53	33.80	3.01	1.01	*	*	*	*	*	*
HL99SH4 379	1.55	33.30	3.00	1.00	*	*	*	*	*	*
HL99SH5 510	1.54	33.10	3.00	1.00	*	*	*	*	*	*
HL99SH6 630	1.53	33.90	3.01	1.00	*	*	*	*	*	*
HL99SH7 769	1.54	35.90	3.01	1.00	108.75	*	1553.20	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
SODIUM CHLORIDE 10.0% 50°C										
HH01SM2 1	1.44	31.30	3.01	1.00	*	*	*	*	*	*
HH01SM1 1	1.61	35.40	3.01	1.00	148.56	147.60	674.56	597.28	29.30	27.30
HH07SM1 7	1.55	33.80	3.00	1.00	144.88	143.92	664.56	590.40	26.94	29.26
HH07SM2 7	1.58	34.50	3.01	1.00	*	174.64	*	*	*	*
HH14SM1 14	27.33	34.80	7.46	6.94	165.84	152.56	655.92	564.96	30.34	29.06
HH14SM2 15	1.54	34.40	3.01	1.00	*	*	*	*	*	*
HH28SM2 28	1.53	33.30	3.01	1.00	*	*	*	*	*	*
HH99SM1 28	1.48	32.40	3.01	1.00	*	*	*	*	*	*
HH28SM1 28	27.40	35.10	7.40	6.92	159.92	179.12	633.84	651.84	30.86	29.06
HH56SM2 56	1.39	29.50	3.01	1.00	*	*	*	*	*	*
HH56SM1 61	23.80	30.30	7.35	6.93	142.96	153.52	642.96	623.04	26.94	28.54
HH99SM2 132	1.48	31.80	3.01	1.00	*	*	*	*	*	*
HH99SM3 254	1.47	31.70	3.01	1.00	*	*	*	*	*	*
HH99SM4 370	1.46	32.10	3.01	1.01	*	*	*	*	*	*
HH99SM5 511	1.46	32.50	3.00	0.99	*	*	*	*	*	*
HH99SM6 624	1.46	33.70	3.01	1.00	*	*	*	*	*	*
HH99SM7 772	1.47	31.00	3.01	0.99	125.00	*	1800.00	*	*	*
SODIUM CHLORIDE 10.0% 23°C										
HL01SM1 1	1.53	33.70	3.01	1.00	146.32	146.96	600.08	587.12	30.46	29.14
HL01SM2 1	1.58	34.80	3.01	1.00	*	*	*	*	*	*
HL07SM1 7	1.56	34.30	3.00	1.00	149.84	2.96	668.80	660.64	27.58	30.22
HL07SM2 7	1.58	35.00	3.00	1.00	*	*	*	*	*	*
HL14SM1 14	26.65	34.00	7.43	6.94	168.24	137.36	668.96	504.96	29.78	28.90
HL14SM2 15	1.61	35.50	3.01	1.00	*	*	*	*	*	*
HL28SM2 28	1.50	32.90	3.00	1.00	*	*	*	*	*	*
HL99SM1 28	1.45	32.50	3.00	1.00	*	*	*	*	*	*
HL28SM1 28	26.01	35.00	7.42	6.54	154.80	113.52	629.52	426.72	29.02	31.62
HL56SM2 56	1.58	34.00	3.00	1.00	*	*	*	*	*	*
HL56SM1 61	25.64	31.90	7.46	6.94	159.92	152.72	672.64	608.80	28.82	29.82
HL99SM2 132	1.46	31.90	3.00	1.00	*	*	*	*	*	*
HL99SM3 246	1.46	32.20	3.01	1.01	*	*	*	*	*	*
HL99SM4 370	1.46	32.00	3.00	1.00	*	*	*	*	*	*
HL99SM5 511	1.47	31.70	3.00	1.00	*	*	*	*	*	*
HL99SM6 624	1.46	32.90	3.01	1.00	*	*	*	*	*	*
HL99SM7 770	1.47	36.90	3.01	1.00	125.00	*	1800.00	*	*	*
WATER 100.0% 50°C										
HH01WP2 1	1.63	*	*	*	*	*	*	*	*	*
HH01WP1 1	1.50	33.00	3.01	1.00	157.68	166.96	637.12	681.10	31.02	28.42
HH07WP1 7	1.53	34.00	3.01	1.00	162.64	162.00	695.10	640.88	25.94	26.78
HH07WP2 7	1.59	34.90	3.01	1.00	*	*	*	*	*	*
HH14WP1 14	27.18	33.70	7.48	6.98	164.70	173.10	580.70	599.40	30.10	29.90
HH14WP2 14	1.65	36.10	3.00	1.00	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
WATER 100.0% 50°C										
HH99WP1 28	1.48	33.10	3.01	1.00	*	*	*	*	*	*
HH28WP2 28	1.57	34.70	3.00	1.00	148.40	157.20	700.72	629.44	26.18	26.02
HH28WP1 28	1.57	34.30	3.00	1.00	158.24	168.72	706.96	628.00	26.86	28.70
HH56WP2 56	1.58	34.80	3.01	1.00	*	*	*	*	*	*
HH56WP1 56	27.28	32.50	7.41	7.39	158.20	159.94	659.40	614.90	28.50	29.30
HH99WP2 133	1.48	32.70	3.01	1.00	*	*	*	*	*	*
HH99WP3 254	1.53	32.70	3.01	1.00	*	*	*	*	*	*
HH99WP4 370	1.51	33.90	3.01	1.00	*	*	*	*	*	*
HH99WP5 503	1.52	32.90	3.01	0.99	*	*	*	*	*	*
HH99WP6 622	1.51	33.90	3.01	1.00	*	*	*	*	*	*
HH99WP7 772	1.52	31.80	3.01	1.00	118.00	*	1712.00	*	*	*
WATER 100.0% 23°C										
HL01WP2 1	*	*	*	*	*	*	*	*	*	*
HL01WP1 1	1.61	36.20	1.00	1.00	150.48	157.52	680.08	641.12	27.30	26.46
HL07WP1 7	1.54	33.90	3.01	1.00	152.88	181.20	640.72	652.08	29.78	31.62
HL07WP2 7	1.54	33.70	3.00	1.00	*	*	*	*	*	*
HL14WP2 14	1.64	37.50	3.01	1.00	*	*	*	*	*	*
HL14WP1 14	27.25	32.70	7.45	7.22	143.40	183.20	613.00	639.00	30.10	26.50
HL28WP2 28	1.57	34.80	3.00	1.00	163.60	163.00	704.72	639.60	30.60	25.50
HL99WP1 28	1.49	32.10	3.00	1.00	*	*	*	*	*	*
HL28WP1 28	1.56	33.80	3.00	1.00	149.04	165.68	666.16	610.96	25.10	26.42
HL56WP1 56	28.71	34.10	7.54	7.36	163.60	158.80	663.44	628.72	29.06	28.50
HL56WP2 56	1.59	35.20	3.00	1.00	*	*	*	*	*	*
HL99WP2 132	1.49	32.20	3.00	1.01	*	*	*	*	*	*
HL99WP3 246	1.48	32.50	3.03	1.03	*	*	*	*	*	*
HL99WP4 370	1.49	33.00	3.00	1.00	*	*	*	*	*	*
HL99WP5 503	1.48	32.20	3.00	1.00	*	*	*	*	*	*
HL99WP6 622	1.48	32.30	3.00	1.01	*	*	*	*	*	*
HL99WP7 770	1.49	36.60	3.00	1.00	126.63	*	1796.25	*	*	*
POTASSIUM DICHROMATE 10.0% 50°C										
HH01XM1 1	1.59	36.20	3.00	1.00	144.62	161.45	584.93	622.64	25.76	26.04
HH07XM1 7	1.40	30.80	3.01	1.00	160.50	168.15	652.32	629.44	30.38	29.63
HH14XM1 14	1.35	31.30	3.01	1.00	146.41	137.82	651.60	553.76	26.86	25.54
HH28XM1 28	1.34	29.90	3.00	1.00	167.90	174.50	690.88	665.44	26.83	25.72
HH99XM1 28	1.40	30.00	3.00	1.00	*	*	*	*	*	*
HH56XM1 55	1.53	33.70	3.00	1.00	162.44	162.12	664.72	630.64	27.32	25.90
HH99XM2 118	1.40	30.50	3.01	1.00	*	*	*	*	*	*
HH99XM3 231	1.41	31.30	3.01	1.00	*	*	*	*	*	*
HH99XM4 363	1.40	30.50	3.01	0.99	*	*	*	*	*	*
HH99XM5 489	1.40	30.30	3.01	0.99	*	*	*	*	*	*
HH99XM6 609	1.40	32.10	3.01	1.00	*	*	*	*	*	*
HH99XM7 749	1.40	30.10	3.01	0.99	80.83	*	1256.83	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
POTASSIUM DICHROMATE 10.0% 23°C										
HL01XM1 1	1.45	31.80	3.01	1.00	149.80	163.05	661.84	653.12	24.10	24.27
HL07XM1 7	1.58	35.50	3.01	1.00	147.72	142.84	677.76	587.44	25.79	27.12
HL14XM1 14	1.34	30.10	3.00	1.00	171.10	137.93	679.20	557.68	24.62	25.09
HL28XM1 28	1.54	34.30	3.00	1.00	155.85	111.14	589.92	430.64	24.67	26.98
HL99XM1 28	1.41	30.40	3.00	1.00	*	*	*	*	*	*
HL56XM1 55	1.57	35.20	3.00	1.00	140.54	153.50	668.64	636.96	27.66	28.92
HL99XM2 118	1.41	30.60	3.00	1.00	*	*	*	*	*	*
HL99XM3 223	1.40	31.60	3.01	1.01	*	*	*	*	*	*
HL99XM4 363	1.40	30.80	3.00	1.00	*	*	*	*	*	*
HL99XM5 489	1.42	30.30	3.00	1.00	*	*	*	*	*	*
HL99XM6 640	1.40	31.80	3.01	1.00	*	*	*	*	*	*
HL99XM7 747	1.39	33.60	3.00	1.00	99.75	*	1552.50	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
			HYDROCHLORIC ACID 10.0% 50°C			
HH01AM1 1	*	*	*	*	*	*
HH01AM2 1	79.92	91.76	16.20	15.10	*	*
HH07AM2 7	85.16	98.00	15.20	14.60	*	*
HH07AM1 7	*	*	*	*	*	*
HH14AM1 14	*	*	*	*	*	*
HH14AM2 14	78.96	88.96	16.20	14.20	*	*
HH99AM1 28	*	*	*	*	*	*
HH28AM1 29	*	*	*	*	*	*
HH28AM2 29	91.20	99.30	15.20	14.60	*	*
HH56AM1 56	*	*	*	*	*	*
HH56AM2 56	99.28	103.20	15.50	14.30	*	*
HH99AM2 144	*	*	*	*	*	*
HH99AM3 252	*	*	*	*	*	*
HH99AM4 368	*	*	*	*	*	*
HH99AM5 511	*	*	*	*	*	*
HH99AM6 621	*	*	*	*	*	*
HH99AM7 770	87.75	*	17.33	*	*	*
			HYDROCHLORIC ACID 10.0% 23°C			
HL01AM2 1	83.60	100.88	16.60	13.40	*	*
HL01AM1 1	*	*	*	*	*	*
HL07AM2 7	94.88	94.00	14.50	11.80	*	*
HL07AM1 7	*	*	*	*	*	*
HL14AM2 14	83.04	98.24	14.80	13.80	*	*
HL14AM1 14	*	*	*	*	*	*
HL99AM1 28	*	*	*	*	*	*
HL28AM1 29	*	*	*	*	*	*
HL28AM2 29	90.88	100.48	15.40	14.50	*	*
HL56AM2 56	86.96	100.88	14.80	13.20	*	*
HL56AM1 56	*	*	*	*	*	*
HL99AM2 144	*	*	*	*	*	*
HL99AM3 238	*	*	*	*	*	*
HL99AM4 368	*	*	*	*	*	*
HL99AM5 511	*	*	*	*	*	*
HL99AM6 621	*	*	*	*	*	*
HL99AM7 768	78.50	*	15.08	*	*	*
			SODIUM HYDROXIDE 10.0% 50°C			
HH01BM1 1	103.20	108.32	14.00	14.00	*	*
HH07BM1 7	90.72	100.48	15.10	15.60	*	*
HH14BM1 13	85.20	90.00	14.80	14.20	*	*
HH28BM1 28	90.30	98.00	16.20	15.00	*	*
HH99BM1 29	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
SODIUM HYDROXIDE 10.0% 50°C						
HH56BM1 56	83.92	98.80	16.80	15.10	*	*
HH99BM2 144	*	*	*	*	*	*
HH99BM3 252	*	*	*	*	*	*
HH99BM4 368	*	*	*	*	*	*
HH99BM5 510	*	*	*	*	*	*
HH99BM6 622	*	*	*	*	*	*
HH99BM7 770	85.17	*	16.83	*	*	*
SODIUM HYDROXIDE 10.0% 23°C						
HL01BM1 1	*	*	*	*	*	*
HL07BM1 7	87.40	99.76	14.80	12.60	*	*
HL14BM1 14	*	99.52	*	13.50	*	*
HL28BM1 28	*	*	*	*	*	*
HL99BM1 28	*	*	*	*	*	*
HL56BM1 56	91.04	89.40	16.30	14.80	*	*
HL99BM2 144	*	*	*	*	*	*
HL99BM3 238	*	*	*	*	*	*
HL99BM4 368	*	*	*	*	*	*
HL99BM5 510	*	*	*	*	*	*
HL99BM6 622	*	*	*	*	*	*
HL99BM7 768	83.92	*	17.02	*	*	*
1 2 DICHLOROETHANE .8% 50°C						
HH01DH1 1	74.90	83.62	19.40	16.30	*	*
HH07DH1 7	74.80	83.40	16.78	15.30	*	*
HH14DH1 14	76.93	83.70	18.30	21.00	*	*
HH28DH1 28	75.30	85.00	20.50	17.10	*	*
HH99DH1 28	*	*	*	*	*	*
HH56DH1 56	*	*	*	*	*	*
HH99DH2 133	*	*	*	*	*	*
HH99DH3 244	*	*	*	*	*	*
HH99DH4 364	*	*	*	*	*	*
HH99DH5 495	*	*	*	*	*	*
HH99DH6 629	*	*	*	*	*	*
HH99DH7 763	84.83	*	16.00	*	*	*
1 2 DICHLOROETHANE .8% 23°C						
HL01DH1 1	72.50	83.80	18.10	16.70	*	*
HL07DH1 7	76.80	82.90	18.80	17.10	*	*
HL14DH1 14	74.40	82.00	18.80	17.80	*	*
HL99DH1 28	*	*	*	*	*	*
HL28DH1 28	73.00	82.50	18.20	15.70	*	*
HL56DH1 56	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
1 2 DICHLOROETHANE .8% 23°C						
HL99DH2 134	*	*	*	*	*	*
HL99DH3 231	*	*	*	*	*	*
HL99DH4 364	*	*	*	*	*	*
HL99DH5 495	*	*	*	*	*	*
HL99DH6 630	*	*	*	*	*	*
HL99DH7 761	83.50	*	17.33	*	*	*
1 2 DICHLOROETHANE .1% 50°C						
HH01DL1 1	74.58	82.28	17.72	16.92	*	*
HH07DL1 7	74.50	85.20	18.10	16.20	*	*
HH14DL1 14	73.80	85.00	18.60	17.20	*	*
HH99DL1 28	*	*	*	*	*	*
HH28DL1 28	73.40	86.00	19.50	17.00	*	*
HH56DL1 56	*	*	*	*	*	*
HH99DL2 139	*	*	*	*	*	*
HH99DL3 246	*	*	*	*	*	*
HH99DL4 370	*	*	*	*	*	*
HH99DL5 496	*	*	*	*	*	*
HH99DL6 631	*	*	*	*	*	*
HH99DL7 765	83.58	*	17.25	*	*	*
1 2 DICHLOROETHANE .1% 23°C						
HL01DL1 1	77.46	86.32	16.69	16.46	*	*
HL07DL1 7	78.60	89.00	23.30	14.90	*	*
HL14DL1 14	77.50	87.10	18.70	16.70	*	*
HL99DL1 28	*	*	*	*	*	*
HL28DL1 28	72.30	84.60	18.10	15.80	*	*
HL56DL1 56	*	*	*	*	*	*
HL99DL2 136	*	*	*	*	*	*
HL99DL3 233	*	*	*	*	*	*
HL99DL4 366	*	*	*	*	*	*
HL99DL5 496	*	*	*	*	*	*
HL99DL6 632	*	*	*	*	*	*
HL99DL7 763	82.42	*	15.42	*	*	*
1 2 DICHLOROETHANE .5% 50°C						
HH01DM1 1	72.60	84.74	18.90	17.00	*	*
HH07DM1 7	70.90	78.20	14.90	16.90	*	*
HH14DM1 14	76.80	82.80	18.50	16.80	*	*
HH28DM1 28	73.00	83.50	19.20	16.80	*	*
HH99DM1 28	*	*	*	*	*	*
HH56DM1 56	*	*	*	*	*	*
HH99DM3 245	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
		1 2 DICHLOROETHANE .5% 50°C				
HH99DM4 365	*	*	*	*	*	*
HH99DM5 496	*	*	*	*	*	*
HH99DM6 630	*	*	*	*	*	*
HH99DM7 764	89.00	*	16.75	*	*	*
		1 2 DICHLOROETHANE .5% 23°C				
HL01DM1 1	76.70	85.68	18.10	16.23	*	*
HL07DM1 7	74.20	83.55	15.90	15.20	*	*
HL14DM1 14	77.20	83.40	17.30	18.00	*	*
HL28DM1 28	75.00	83.20	17.80	17.20	*	*
HL99DM1 28	*	*	*	*	*	*
HL56DM1 56	*	*	*	*	*	*
HL99DM2 135	*	*	*	*	*	*
HL99DM3 233	*	*	*	*	*	*
HL99DM4 365	*	*	*	*	*	*
HL99DM5 496	*	*	*	*	*	*
HL99DM6 631	*	*	*	*	*	*
HL99DM7 762	86.58	*	17.42	*	*	*
		FURFURAL 8.0% 50°C				
HH01FH1 1	80.72	88.00	15.80	15.50	*	*
HH07FH1 7	74.67	86.00	17.40	15.90	*	*
HH14FH1 14	76.80	87.40	17.40	16.30	*	*
HH28FH1 28	74.67	83.20	17.30	15.90	*	*
HH99FH1 28	*	*	*	*	*	*
HH56FH1 56	83.07	89.44	16.20	15.90	*	*
HH99FH2 117	*	*	*	*	*	*
HH99FH3 236	*	*	*	*	*	*
HH99FH4 350	*	*	*	*	*	*
HH99FH5 485	*	*	*	*	*	*
HH99FH6 616	*	*	*	*	*	*
HH99FH7 750	88.70	*	19.50	*	*	*
		FURFURAL 8.0% 23°C				
HL01FH1 1	84.16	90.24	16.60	15.50	*	*
HL07FH1 7	77.80	85.50	16.50	15.60	*	*
HL14FH1 14	77.73	88.40	17.40	15.80	*	*
HL99FH1 28	*	*	*	*	*	*
HL28FH1 28	75.20	82.40	16.90	16.00	*	*
HL56FH1 56	77.20	88.67	16.70	16.00	*	*
HL99FH2 117	*	*	*	*	*	*
HL99FH3 219	*	*	*	*	*	*
HL99FH4 350	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
FURFURAL 8.0% 23°C						
HL99FH5 485	*	*	*	*	*	*
HL99FH6 617	*	*	*	*	*	*
HL99FH7 748	83.92	*	16.30	*	*	*
FURFURAL 1.0% 50°C						
HH01FL1 1	83.00	89.28	16.80	15.80	*	*
HH07FL1 7	78.80	88.40	16.90	15.90	*	*
HH14FL1 14	76.16	85.84	17.40	17.20	*	*
HH28FL1 28	80.20	90.00	15.80	15.80	*	*
HH99FL1 29	*	*	*	*	*	*
HH56FL1 56	79.07	90.27	16.70	16.70	*	*
HH99FL2 124	*	*	*	*	*	*
HH99FL3 242	*	*	*	*	*	*
HH99FL4 356	*	*	*	*	*	*
HH99FL5 489	*	*	*	*	*	*
HH99FL6 622	*	*	*	*	*	*
HH99FL7 756	93.83	*	18.25	*	*	*
FURFURAL 1.0% 23°C						
HL01FL1 1	83.00	92.56	16.00	13.80	*	*
HL07FL1 7	78.13	87.87	16.70	15.60	*	*
HL14FL1 14	77.80	84.88	16.50	16.90	*	*
HL28FL1 28	*	*	*	*	*	*
HL28FL2 28	76.40	84.80	16.40	15.40	*	*
HL99FL1 29	*	*	*	*	*	*
HL56FL1 56	78.53	92.53	15.40	13.80	*	*
HL99FL2 124	*	*	*	*	*	*
HL99FL3 225	*	*	*	*	*	*
HL99FL4 356	*	*	*	*	*	*
HL99FL5 489	*	*	*	*	*	*
HL99FL6 623	*	*	*	*	*	*
HL99FL7 754	86.75	*	15.75	*	*	*
FURFURAL 4.0% 50°C						
HH01FM1 1	82.32	90.24	16.50	14.80	*	*
HH07FM1 7	77.60	87.73	16.40	15.60	*	*
HH14FM1 14	76.80	86.93	16.70	15.60	*	*
HH28FM1 28	76.00	85.50	17.40	16.70	*	*
HH99FM1 29	*	*	*	*	*	*
HH56FM1 56	82.80	90.27	17.20	15.90	*	*
HH99FM2 124	*	*	*	*	*	*
HH99FM3 242	*	*	*	*	*	*
HH99FM4 356	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
			FURFURAL 4.0% 50°C			
HH99FM5 490	*	*	*	*	*	*
HH99FM6 622	*	*	*	*	*	*
HH99FM7 756	86.25	*	19.67	*	*	*
			FURFURAL 4.0% 23°C			
HL01FM1 1	79.84	93.12	15.70	14.60	*	*
HL07FM1 7	77.33	86.16	17.90	15.40	*	*
HL14FM1 14	77.00	86.20	16.50	15.40	*	*
HL28FM1 28	74.67	85.50	16.90	15.60	*	*
HL99FM1 29	*	*	*	*	*	*
HL56FM1 56	78.13	86.00	16.70	14.60	*	*
HL99FM2 124	*	*	*	*	*	*
HL99FM3 228	*	*	*	*	*	*
HL99FM4 356	*	*	*	*	*	*
HL99FM5 490	*	*	*	*	*	*
HL99FM6 623	*	*	*	*	*	*
HL99FM7 754	86.75	*	16.33	*	*	*
			METHYL ETHYL KETONE 26.0% 50°C			
HH01MH1 1	78.08	88.80	15.40	15.50	*	*
HH07MH1 7	80.32	88.16	16.00	13.70	*	*
HH14MH1 14	80.24	90.08	15.50	13.80	*	*
HH28MH1 28	79.30	89.44	16.00	14.90	*	*
HH99MH1 29	*	*	*	*	*	*
HH56MH1 57	71.84	83.36	18.00	17.20	*	*
HH99MH2 122	*	*	*	*	*	*
HH99MH3 240	*	*	*	*	*	*
HH99MH4 358	*	*	*	*	*	*
HH99MH5 493	*	*	*	*	*	*
HH99MH6 626	*	*	*	*	*	*
HH99MH7 759	83.25	*	17.58	*	*	*
			METHYL ETHYL KETONE 26.0% 23°C			
HL01MH1 1	82.20	92.08	15.00	14.30	*	*
HL07MH1 7	79.68	88.88	14.30	13.40	*	*
HL14MH1 14	80.72	90.24	14.30	13.70	*	*
HL28MH1 28	81.04	87.28	14.50	13.50	*	*
HL99MH1 29	*	*	*	*	*	*
HL56MH1 57	80.64	88.24	15.10	14.80	*	*
HL99MH2 122	*	*	*	*	*	*
HL99MH3 235	*	*	*	*	*	*
HL99MH4 358	*	*	*	*	*	*
HL99MH5 493	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
			METHYL ETHYL KETONE 26.0% 23°C			
HL99MH6 627	*	*	*	*	*	*
HL99MH7 757	80.17	*	18.25	*	*	*
			METHYL ETHYL KETONE 3.0% 50°C			
HH01ML1 1	75.76	80.56	16.30	16.00	*	*
HH07ML1 7	80.64	92.00	14.80	14.90	*	*
HH14ML1 14	83.28	92.88	15.50	13.50	*	*
HH28ML1 28	80.56	89.60	15.70	14.60	*	*
HH99ML1 28	*	*	*	*	*	*
HH56ML1 57	80.80	91.44	16.20	14.50	*	*
HH99ML2 120	*	*	*	*	*	*
HH99ML3 240	*	*	*	*	*	*
HH99ML4 358	*	*	*	*	*	*
HH99ML5 493	*	*	*	*	*	*
HH99ML6 626	*	*	*	*	*	*
HH99ML7 759	93.42	*	18.83	*	*	*
			METHYL ETHYL KETONE 3.0% 23°C			
HL01ML1 1	82.32	92.16	14.80	13.80	*	*
HL07ML1 7	81.68	92.16	13.80	13.40	*	*
HL14ML1 14	78.40	90.48	15.20	14.80	*	*
HL28ML1 28	83.10	91.68	15.40	14.00	*	*
HL99ML1 28	*	*	*	*	*	*
HL56ML1 57	81.68	91.84	15.50	14.20	*	*
HL99ML2 120	*	*	*	*	*	*
HL99ML3 235	*	*	*	*	*	*
HL99ML4 358	*	*	*	*	*	*
HL99ML5 494	*	*	*	*	*	*
HL99ML6 627	*	*	*	*	*	*
HL99ML7 757	80.58	*	16.70	*	*	*
			METHYL ETHYL KETONE 13.0% 50°C			
HH01MM1 1	81.28	88.40	15.40	14.40	*	*
HH07MM1 7	81.20	94.24	16.50	14.80	*	*
HH14MM1 14	78.16	87.92	15.40	13.80	*	*
HH99MM1 28	*	*	*	*	*	*
HH28MM1 28	79.04	90.56	16.50	14.20	*	*
HH56MM1 57	76.40	86.32	17.10	16.50	*	*
HH99MM2 120	*	*	*	*	*	*
HH99MM3 239	*	*	*	*	*	*
HH99MM4 357	*	*	*	*	*	*
HH99MM5 493	*	*	*	*	*	*
HH99MM6 625	*	*	*	*	*	*
HH99MM7 758	82.92	*	19.83	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
METHYL ETHYL KETONE 13.0% 23°C						
HL01MM1 1	74.72	84.56	15.20	14.90	*	*
HL07MM1 7	80.24	91.60	15.10	13.40	*	*
HL14MM1 14	81.40	92.80	16.20	14.50	*	*
HL28MM1 28	78.40	90.32	15.40	14.00	*	*
HL99MM1 28	*	*	*	*	*	*
HL56MM1 57	82.40	92.08	15.70	14.30	*	*
HL99MM2 120	*	*	*	*	*	*
HL99MM3 234	*	*	*	*	*	*
HL99MM4 357	*	*	*	*	*	*
HL99MM5 493	*	*	*	*	*	*
HL99MM6 626	*	*	*	*	*	*
HL99MM7 756	80.00	*	17.00	*	*	*
ASTM #2 OIL SATURATED 50°C						
HH010M1 1	84.32	93.20	15.10	14.80	*	*
HH070M1 7	79.36	87.60	16.30	16.80	*	*
HH140M1 13	82.96	91.44	16.60	15.70	*	*
HH280M1 28	*	*	*	*	*	*
HH990M1 28	77.83	*	29.50	*	*	*
HH560M1 56	84.60	94.00	15.60	14.80	*	*
HH990M2 128	*	*	*	*	*	*
HH990M3 251	*	*	*	*	*	*
HH990M4 364	*	*	*	*	*	*
HH990M5 503	*	*	*	*	*	*
HH990M6 626	*	*	*	*	*	*
HH990M7 765	77.83	*	29.50	*	*	*
ASTM #2 OIL SATURATED 23°C						
HL010M1 1	81.00	91.52	15.60	15.10	*	*
HL070M1 7	79.52	89.36	15.70	15.20	*	*
HL140M1 13	79.92	89.68	16.50	15.70	*	*
HL990M1 28	*	*	*	*	*	*
HL280M1 28	*	*	*	*	*	*
HL560M1 56	86.56	99.60	16.00	14.60	*	*
HL990M2 128	*	*	*	*	*	*
HL990M3 237	*	*	*	*	*	*
HL990M4 364	*	*	*	*	*	*
HL990M5 503	*	*	*	*	*	*
HL990M6 626	*	*	*	*	*	*
HL990M7 763	79.70	*	24.40	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
ASTM #2 OIL 100.0% 50°C						
HH010P1 1	75.20	81.76	16.80	16.30	*	*
HH070P1 7	71.36	*	19.70	*	*	*
HH140P1 14	70.80	77.60	19.20	19.40	*	*
HH280P1 28	73.07	80.64	21.50	20.80	*	*
HH990P1 28	*	*	*	*	*	*
HH560P1 56	70.16	76.16	21.70	22.00	*	*
HH990P2 141	*	*	*	*	*	*
HH990P3 257	*	*	*	*	*	*
HH990P4 385	*	*	*	*	*	*
HH990P5 509	*	*	*	*	*	*
HH990P6 627	*	*	*	*	*	*
HH990P7 771	82.00	*	30.00	*	*	*
ASTM #2 OIL 100.0% 23°C						
HL010P1 1	75.92	82.00	15.70	15.40	*	*
HL070P1 7	76.88	86.24	16.00	14.80	*	*
HL140P1 14	78.08	84.24	16.60	15.20	*	*
HL990P1 28	*	*	*	*	*	*
HL280P1 28	77.04	86.80	16.60	15.40	*	*
HL560P1 56	77.04	88.08	16.20	15.40	*	*
HL990P2 141	*	*	*	*	*	*
HL990P3 244	*	*	*	*	*	*
HL990P4 385	*	*	*	*	*	*
HL990P5 509	*	*	*	*	*	*
HL990P6 627	*	*	*	*	*	*
HL990P7 769	82.00	*	24.58	*	*	*
PHENOL 8.0% 50°C						
HH01PH1 1	73.46	83.88	18.80	16.00	*	*
HH07PH1 7	73.46	82.10	18.69	14.80	*	*
HH14PH1 14	72.80	81.10	18.80	17.81	*	*
HH28PH1 28	77.14	85.72	17.77	15.50	*	*
HH99PH1 29	*	*	*	*	*	*
HH56PH1 56	74.40	81.90	18.90	16.92	*	*
HH99PH2 121	*	*	*	*	*	*
HH99PH3 243	*	*	*	*	*	*
HH99PH4 362	*	*	*	*	*	*
HH99PH5 499	*	*	*	*	*	*
HH99PH6 624	*	*	*	*	*	*
HH99PH7 757	87.00	*	17.20	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
PHENOL 8.0% 23°C						
HL01PH1 1	77.98	82.72	17.58	15.10	*	*
HL07PH1 7	72.90	86.68	17.90	16.50	*	*
HL14PH1 14	75.70	85.02	17.70	17.70	*	*
HL28PH1 28	76.62	84.60	15.67	14.30	*	*
HL99PH1 29	*	*	*	*	*	*
HL56PH1 56	73.78	82.14	18.40	16.70	*	*
HL99PH2 121	*	*	*	*	*	*
HL99PH3 230	*	*	*	*	*	*
HL99PH4 362	*	*	*	*	*	*
HL99PH5 499	*	*	*	*	*	*
HL99PH6 625	*	*	*	*	*	*
HL99PH7 755	87.08	*	17.16	*	*	*
PHENOL 1.0% 50°C						
HH99PL4 1	*	*	*	*	*	*
HH01PL1 1	75.44	88.50	18.60	19.00	*	*
HH07PL1 7	75.02	84.46	17.84	15.40	*	*
HH14PL1 14	75.56	83.28	17.96	16.20	*	*
HH28PL1 28	76.28	85.20	16.70	15.70	*	*
HH99PL1 28	*	*	*	*	*	*
HH56PL1 56	77.80	86.58	18.90	15.30	*	*
HH99PL2 122	*	*	*	*	*	*
HH99PL3 245	*	*	*	*	*	*
HH99PL5 499	*	*	*	*	*	*
HH99PL6 625	*	*	*	*	*	*
HH99PL7 758	82.42	*	17.92	*	*	*
PHENOL 1.0% 23°C						
HL01PL1 1	77.98	87.10	16.73	15.30	*	*
HL07PL1 7	78.92	86.68	15.77	15.60	*	*
HL14PL1 14	74.88	83.08	18.46	16.50	*	*
HL28PL1 28	77.20	88.34	15.96	15.38	*	*
HL99PL1 28	*	*	*	*	*	*
HL56PL1 56	75.82	85.40	14.60	16.50	*	*
HL99PL2 122	*	*	*	*	*	*
HL99PL3 233	*	*	*	*	*	*
HL99PL4 363	*	*	*	*	*	*
HL99PL5 499	*	*	*	*	*	*
HL99PL6 626	*	*	*	*	*	*
HL99PL7 756	79.92	*	15.58	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

		YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
			PHENOL 4.0% 50°C				
HH01PM1	1	80.20	72.56	16.40	18.00	*	*
HH07PM1	7	78.88	87.22	18.20	16.23	*	*
HH14PM1	14	77.36	80.70	17.19	16.23	*	*
HH28PM1	28	77.60	84.46	17.34	15.00	*	*
HH99PM1	29	*	*	*	*	*	*
HH56PM1	56	76.44	85.46	18.35	18.23	*	*
HH99PM2	121	*	*	*	*	*	*
HH99PM3	244	*	*	*	*	*	*
HH99PM4	362	*	*	*	*	*	*
HH99PM5	499	*	*	*	*	*	*
HH99PM6	624	*	*	*	*	*	*
HH99PM7	757	89.58	*	19.83	*	*	*
			PHENOL 4.0% 23°C				
HL01PM1	1	75.16	83.16	16.70	15.00	*	*
HL07PM1	7	75.56	82.00	17.27	14.80	*	*
HL14PM1	14	75.22	86.70	17.90	16.23	*	*
HL28PM1	28	77.65	85.55	17.08	15.60	*	*
HL99PM1	29	*	*	*	*	*	*
HL56PM1	56	75.06	84.84	17.77	15.65	*	*
HL99PM2	121	*	*	*	*	*	*
HL99PM3	231	*	*	*	*	*	*
HL99PM4	362	*	*	*	*	*	*
HL99PM5	499	*	*	*	*	*	*
HL99PM6	625	*	*	*	*	*	*
HL99PM7	755	85.25	*	16.33	*	*	*
			SODIUM CHLORIDE 35.0% 50°C				
HH01SH1	1	*	*	*	*	*	*
HH07SH1	7	*	*	*	*	*	*
HH14SH1	14	79.48	96.40	16.30	13.80	*	*
HH99SH1	28	*	*	*	*	*	*
HH28SH1	28	94.72	*	14.90	*	*	*
HH56SH1	56	84.80	95.92	16.90	15.50	*	*
HH99SH2	131	*	*	*	*	*	*
HH99SH3	253	*	*	*	*	*	*
HH99SH4	379	*	*	*	*	*	*
HH99SH5	510	*	*	*	*	*	*
HH99SH6	630	*	*	*	*	*	*
HH99SH7	771	88.33	*	18.00	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
		SODIUM CHLORIDE 35.0% 23°C				
HL01SH1 1	*	*	*	*	*	*
HL07SH1 7	*	*	*	*	*	*
HL14SH1 14	79.60	90.32	15.20	13.20	*	*
HL28SH1 28	*	*	*	*	*	*
HL99SH1 28	*	*	*	*	*	*
HL56SH1 56	79.04	91.36	16.50	15.20	*	*
HL99SH2 131	*	*	*	*	*	*
HL99SH3 246	*	*	*	*	*	*
HL99SH4 379	*	*	*	*	*	*
HL99SH5 510	*	*	*	*	*	*
HL99SH6 630	*	*	*	*	*	*
HL99SH7 769	89.00	*	14.75	*	*	*
		SODIUM CHLORIDE 10.0% 50°C				
HH01SM2 1	86.32	96.24	16.50	14.90	*	*
HH01SM1 1	*	*	*	*	*	*
HH07SM1 7	*	*	*	15.37	*	*
HH07SM2 7	81.07	98.00	16.70	16.00	*	*
HH14SM1 14	*	*	*	*	*	*
HH14SM2 15	87.68	100.56	16.20	14.00	*	*
HH28SM2 28	84.88	100.64	15.80	14.20	*	*
HH99SM1 28	*	*	*	*	*	*
HH28SM1 28	*	*	*	*	*	*
HH56SM2 56	81.60	104.88	15.70	14.20	*	*
HH56SM1 61	*	*	*	*	*	*
HH99SM2 132	*	*	*	*	*	*
HH99SM3 254	*	*	*	*	*	*
HH99SM4 370	*	*	*	*	*	*
HH99SM5 511	*	*	*	*	*	*
HH99SM6 624	*	*	*	*	*	*
HH99SM7 772	92.00	*	17.00	*	*	*
		SODIUM CHLORIDE 10.0% 23°C				
HL01SM1 1	*	*	*	*	*	*
HL01SM2 1	90.88	99.68	17.10	15.40	*	*
HL07SM1 7	*	*	*	*	*	*
HL07SM2 7	77.44	92.56	16.60	14.80	*	*
HL14SM1 14	*	*	*	*	*	*
HL14SM2 15	96.00	100.88	14.60	14.90	*	*
HL28SM2 28	100.88	97.12	15.20	13.60	*	*
HL99SM1 28	*	*	*	*	*	*
HL28SM1 28	*	*	*	*	*	*
HL56SM2 56	94.96	101.60	14.50	13.70	*	*
HL56SM1 61	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
SODIUM CHLORIDE 10.0% 23°C						
HL99SM2 132	*	*	*	*	*	*
HL99SM3 246	*	*	*	*	*	*
HL99SM4 370	*	*	*	*	*	*
HL99SM5 511	*	*	*	*	*	*
HL99SM6 624	*	*	*	*	*	*
HL99SM7 770	85.00	*	16.00	*	*	*
WATER 100.0% 50°C						
HH01WP2 1	90.50	91.36	16.00	15.20	*	*
HH01WP1 1	*	*	*	*	*	*
HH07WP1 7	*	*	*	*	*	*
HH07WP2 7	89.52	97.84	16.60	13.80	*	*
HH14WP1 14	87.60	99.10	*	*	*	*
HH14WP2 14	93.68	104.32	15.20	14.20	*	*
HH99WP1 28	*	*	*	*	*	*
HH28WP2 28	*	*	*	*	*	*
HH28WP1 28	*	*	*	*	*	*
HH56WP2 56	93.76	99.84	15.50	13.40	*	*
HH56WP1 56	*	*	*	*	*	*
HH99WP2 133	*	*	*	*	*	*
HH99WP3 254	*	*	*	*	*	*
HH99WP4 370	*	*	*	*	*	*
HH99WP5 503	*	*	*	*	*	*
HH99WP6 622	*	*	*	*	*	*
HH99WP7 772	93.00	*	17.50	*	*	*
WATER 100.0% 23°C						
HL01WP2 1	84.72	89.92	15.70	13.80	*	*
HL01WP1 1	*	*	*	*	*	*
HL07WP1 7	*	*	*	*	*	*
HL07WP2 7	93.20	102.00	15.70	14.30	*	*
HL14WP2 14	95.36	100.48	15.10	13.70	*	*
HL14WP1 14	79.30	98.20	*	*	*	*
HL28WP2 28	*	*	*	*	*	*
HL99WP1 28	*	*	*	*	*	*
HL28WP1 28	*	*	*	*	*	*
HL56WP1 56	*	*	*	*	*	*
HL56WP2 56	83.84	93.36	13.40	13.10	*	*
HL99WP2 132	*	*	*	*	*	*
HL99WP3 246	*	*	*	*	*	*
HL99WP4 370	*	*	*	*	*	*
HL99WP5 503	*	*	*	*	*	*
HL99WP6 622	*	*	*	*	*	*
HL99WP7 770	86.25	*	15.58	*	*	*

HIGH DENSITY POLYETHYLENE: AVERAGE FINAL PROPERTIES

	YIELD STRENGTH M (lb/ inch width)	YIELD STRENGTH T (lb/ inch width)	ELONGATION AT YIELD M (inch)	ELONGATION AT YIELD T (inch)	MODULUS OF ELASTICITY M (PSI)	MODULUS OF ELASTICITY T (PSI)
			POTASSIUM DICHROMATE 10.0% 50°C			
HH01XM1 1	92.00	94.64	16.80	15.60	*	*
HH07XM1 7	90.64	95.60	15.40	14.10	*	*
HH14XM1 14	83.44	93.36	16.20	14.00	*	*
HH28XM1 28	92.00	95.36	16.70	14.50	*	*
HH99XM1 28	*	*	*	*	*	*
HH56XM1 55	94.72	99.20	16.60	16.10	*	*
HH99XM2 118	*	*	*	*	*	*
HH99XM3 231	*	*	*	*	*	*
HH99XM4 363	*	*	*	*	*	*
HH99XM5 489	*	*	*	*	*	*
HH99XM6 609	*	*	*	*	*	*
HH99XM7 749	85.25	*	17.75	*	*	*
			POTASSIUM DICHROMATE 10.0% 23°C			
HL01XM1 1	83.20	92.00	16.20	13.20	*	*
HL07XM1 7	80.64	89.68	15.70	13.70	*	*
HL14XM1 14	97.60	93.28	15.20	13.50	*	*
HL28XM1 28	89.40	98.64	14.60	14.20	*	*
HL99XM1 28	*	*	*	*	*	*
HL56XM1 55	80.48	89.20	15.50	15.20	*	*
HL99XM2 118	*	*	*	*	*	*
HL99XM3 223	*	*	*	*	*	*
HL99XM4 363	*	*	*	*	*	*
HL99XM5 489	*	*	*	*	*	*
HL99XM6 640	*	*	*	*	*	*
HL99XM7 747	81.75	*	14.42	*	*	*

HDPE :   STATISTICS

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
HYDROCHLORIC ACID 10.0% 50°C												
HH01AM1 1	5	9.170	05	2.160	5	31.070	5	9.600	07	0.530	7	0.870
HH01AM2 1	0	*	00	*	0	*	0	*	00	*	0	*
HH07AM2 7	0	*	00	*	0	*	0	*	00	*	0	*
HH07AM1 7	5	13.740	05	14.060	5	50.670	5	49.360	05	1.290	5	1.010
HH14AM1 14	5	16.600	05	3.030	5	64.570	5	8.860	05	0.680	5	0.480
HH14AM2 14	5	*	00	*	0	*	0	*	00	*	0	*
HH28AM1 29	5	12.620	05	11.100	5	57.550	5	47.200	10	0.702	10	2.100
HH28AM2 29	0	*	00	*	0	*	0	*	05	*	5	*
HH56AM1 56	5	11.100	05	9.310	5	47.200	5	36.670	05	0.920	5	0.680
HH56AM2 56	0	*	00	*	0	*	0	*	05	*	5	*
HYDROCHLORIC ACID 10.0% 23°C												
HL01AM2 1	0	*	00	*	0	*	0	*	05	*	5	*
HL01AM1 1	5	11.240	05	1.660	5	42.410	5	4.170	07	0.380	6	0.330
HL07AM2 7	0	*	00	*	0	*	0	*	05	*	5	*
HL07AM1 7	5	11.090	05	11.390	5	8.060	5	40.690	05	0.650	5	1.060
HL14AM1 14	5	12.100	05	16.940	5	45.650	5	55.980	05	1.350	5	0.330
HL14AM2 14	0	*	00	*	0	*	0	*	05	*	5	*
HL28AM1 29	5	6.780	05	4.660	5	41.630	5	12.650	10	1.540	10	2.190
HL28AM2 29	0	*	00	*	0	*	0	*	05	*	5	*
HL56AM1 56	5	5.440	05	6.060	5	13.680	5	20.350	05	0.880	5	0.560
HL56AM2 56	0	*	00	*	0	*	0	*	05	*	5	*
SODIUM HYDROXIDE 10.0% 50°C												
HH01BM1 1	5	3.480	05	4.340	5	11.600	5	9.490	10	0.380	10	0.460
HH07BM1 7	5	12.970	05	8.740	5	56.970	5	32.030	10	0.590	10	0.680
HH14BM1 13	5	24.000	05	14.570	5	78.180	5	46.770	09	1.190	10	0.840
HH28BM1 28	5	8.710	05	11.540	5	33.260	5	42.520	08	0.300	10	0.220
HH56BM1 56	5	6.330	05	3.860	5	28.000	5	14.540	10	0.730	10	1.720
SODIUM HYDROXIDE 10.0% 23°C												
HL01BM1 1	5	30.970	05	3.610	5	******	5	14.000	10	0.510	10	0.490
HL07BM1 7	5	26.100	05	3.570	5	******	5	11.280	10	0.940	10	0.540
HL14BM1 14	5	15.960	05	16.540	5	57.940	5	48.900	09	0.880	9	1.360
HL28BM1 28	5	5.340	05	12.040	5	15.930	5	40.830	10	0.360	10	0.470
HL56BM1 56	5	11.150	05	4.740	5	43.880	5	17.030	10	1.750	10	1.190
1 2 DICHLOROETHANE .8% 50°C												
HH01DH1 1	5	6.320	05	10.320	5	23.100	5	33.200	05	0.350	5	0.110
HH07DH1 7	4	8.093	05	6.500	4	33.239	5	27.500	05	0.200	5	0.600
HH14DH1 14	5	12.200	05	4.900	5	42.000	5	2*	05	0.500	4	0.600

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
1 2 DICHLOROETHANE .8% 50°C												
HH28DH1 28	5	9.900	05	7.400	5	40.500	5	23.000	05	1.200	5	1.300
HH56DH1 56	0	*	00	*	0	*	0	*	05	0.360	5	0.400
1 2 DICHLOROETHANE .8% 23°C												
HL01DH1 1	5	7.900	05	5.800	5	33.800	5	21.000	05	0.400	5	0.520
HL07DH1 7	5	3.700	05	1.500	5	13.000	5	23.500	05	0.500	5	0.300
HL14DH1 14	5	2.500	05	7.100	5	9.300	5	26.000	05	0.600	5	1.900
HL28DH1 28	5	5.000	05	4.300	5	17.000	5	17.000	05	0.500	5	0.900
HL56DH1 56	0	*	00	*	0	*	0	*	05	0.400	5	0.300
1 2 DICHLOROETHANE .1% 50°C												
HH01DL1 1	5	4.270	05	15.200	5	12.600	5	52.700	05	0.660	5	0.260
HH07DL1 7	5	6.700	05	7.100	5	28.700	5	24.000	05	0.630	5	0.600
HH14DL1 14	5	8.600	05	3.900	5	37.000	5	11.000	05	0.700	5	0.500
HH28DL1 28	5	8.800	05	2.600	5	33.700	5	9.700	05	1.300	5	2.300
HH56DL1 56	0	*	00	*	0	*	0	*	05	0.300	5	0.200
1 2 DICHLOROETHANE .1% 23°C												
HL01DL1 1	5	8.850	05	5.500	5	30.400	5	21.000	05	0.630	5	0.700
HL07DL1 7	5	4.000	05	4.200	5	2*	5	29.000	05	0.500	5	0.300
HL14DL1 14	5	4.500	05	6.200	5	16.900	5	26.300	05	0.500	5	0.300
HL28DL1 28	5	3.400	05	9.400	5	18.000	5	37.000	05	1.500	5	1.800
HL56DL1 56	0	*	00	*	0	*	0	*	05	0.400	5	0.300
1 2 DICHLOROETHANE .5% 50°C												
HH01DM1 1	5	4.140	05	13.300	5	17.000	5	16.600	05	0.710	5	0.840
HH07DM1 7	5	11.800	05	4.500	5	51.000	5	14.000	05	0.400	5	0.400
HH14DM1 14	5	5.800	05	10.100	5	22.100	5	32.500	05	0.800	5	0.200
HH28DM1 28	5	3.100	05	5.400	5	13.000	5	19.400	05	0.600	5	1.000
HH56DM1 56	0	*	00	*	0	*	0	*	05	0.800	5	0.700
1 2 DICHLOROETHANE .5% 23°C												
HL01DM1 1	5	9.040	05	11.870	5	43.920	5	43.100	05	0.620	5	0.700
HL07DM1 7	4	8.000	02	*	4	29.200	2	*	05	0.400	5	2.400
HL14DM1 14	5	3.300	05	5.900	5	14.300	5	21.200	05	1.800	5	0.900
HL28DM1 28	5	13.500	05	1.400	5	56.000	5	6.000	05	0.600	5	2.500
HL56DM1 56	0	*	00	*	0	*	0	*	05	0.300	5	0.400

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
FURFURAL 8.0% 50°C												
HH01FH1 1	5	3.489	05	6.372	5	14.137	5	19.326	05	0.740	5	1.501
HH07FH1 7	5	5.740	05	6.480	5	25.400	5	24.500	05	0.563	5	0.740
HH14FH1 14	5	6.020	05	4.240	5	22.300	5	15.800	05	0.784	5	1.000
HH28FH1 28	5	1.620	05	1.410	5	7.600	5	5.000	05	0.427	5	1.240
HH56FH1 56	5	20.400	05	9.380	5	72.700	5	28.100	05	0.374	5	1.934
FURFURAL 8.0% 23°C												
HL01FH1 1	5	4.819	05	0.502	5	17.972	5	3.500	05	0.493	5	1.200
HL07FH1 7	5	3.530	05	2.170	5	11.000	5	10.900	05	0.570	5	0.803
HL14FH1 14	5	2.050	05	5.230	5	4.000	5	17.600	05	0.900	5	1.510
HL28FH1 28	5	6.870	05	11.310	5	51.100	5	40.200	05	0.300	5	1.134
HL56FH1 56	5	11.710	05	15.750	5	56.900	5	55.700	05	0.488	5	0.167
FURFURAL 1.0% 50°C												
HH01FL1 1	5	59.900	05	3.094	5	59.330	5	10.950	05	0.670	5	1.910
HH07FL1 7	5	5.030	05	5.260	5	14.000	5	12.000	05	0.594	5	0.224
HH14FL1 14	5	13.010	05	10.640	5	46.700	5	36.400	05	0.360	5	0.410
HH28FL1 28	5	13.510	05	10.790	5	50.700	5	33.800	05	1.790	5	1.605
HH56FL1 56	5	*	05	4.960	5	11.300	5	18.800	05	0.439	5	0.205
FURFURAL 1.0% 23°C												
HL01FL1 1	5	2.740	05	1.840	5	15.990	5	8.290	05	1.250	5	3.100
HL07FL1 7	5	5.080	05	4.940	5	18.100	5	18.100	05	0.270	5	0.885
HL14FL1 14	5	4.430	05	6.390	5	13.100	5	24.500	05	0.703	5	2.160
HL28FL1 28	0	*	00	*	0	*	0	*	05	0.760	5	0.677
HL28FL2 28	5	10.470	05	2.720	5	14.100	5	18.900	05	0.570	5	0.952
HL56FL1 56	5	5.090	05	9.250	5	9.900	5	47.800	05	0.321	5	1.286
FURFURAL 4.0% 50°C												
HH01FM1 1	5	4.580	05	6.930	5	18.160	5	11.300	05	1.740	5	1.800
HH07FM1 7	5	6.550	05	2.470	5	27.200	5	7.000	05	0.594	5	0.370
HH14FM1 14	5	3.420	05	6.050	5	13.300	5	22.300	05	0.288	5	0.394
HH28FM1 28	5	8.700	05	1.440	5	58.600	5	23.400	05	0.396	5	0.404
HH56FM1 56	5	8.720	05	5.100	5	29.500	5	29.800	05	0.570	5	0.292
FURFURAL 4.0% 23°C												
HL01FM1 1	5	6.421	05	3.240	5	22.410	5	10.327	05	1.382	5	0.817
HL07FM1 7	5	3.240	05	4.320	5	15.100	5	59.500	05	0.493	5	0.900
HL14FM1 14	5	6.110	05	1.150	5	20.500	5	25.800	05	0.819	5	0.709
HL28FM1 28	5	13.200	05	3.090	5	60.400	5	51.800	05	1.187	5	0.502
HL56FM1 56	5	3.480	05	7.800	5	12.900	5	44.100	05	0.526	5	0.522

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
METHYL ETHYL KETONE 26.0% 50°C												
HH01MH1 1	5	8.170	05	7.214	5	29.200	5	24.610	05	0.910	5	1.840
HH07MH1 7	5	2.760	05	14.727	5	15.496	5	51.313	05	0.184	5	1.347
HH14MH1 14	5	17.356	05	8.248	5	******	5	28.539	05	0.197	5	0.165
HH28MH1 28	4	8.820	05	9.836	4	31.895	5	34.117	05	0.597	5	0.357
HH56MH1 57	5	8.753	05	3.280	5	37.940	5	15.450	05	0.370	5	0.123
METHYL ETHYL KETONE 26.0% 23°C												
HL01MH1 1	5	14.340	05	5.630	5	50.250	5	17.930	05	0.410	5	0.330
HL07MH1 7	5	11.743	05	10.241	5	45.280	5	30.439	05	0.200	5	0.319
HL14MH1 14	5	10.786	05	10.919	5	41.800	5	32.158	05	2.385	5	0.491
HL28MH1 28	5	6.537	05	14.798	5	22.149	5	50.851	05	0.865	5	0.418
HL56MH1 57	5	78.000	05	16.624	5	******	5	57.054	05	0.318	5	0.567
METHYL ETHYL KETONE 3.0% 50°C												
HH01ML1 1	5	6.610	05	9.910	5	29.080	5	41.380	05	0.400	5	0.540
HH07ML1 7	5	10.278	05	0.781	5	27.952	5	30.809	05	0.279	5	0.444
HH14ML1 14	5	9.745	05	3.960	5	40.831	5	13.517	05	0.281	5	0.222
HH28ML1 28	5	9.331	05	13.371	5	26.953	5	49.745	05	0.744	5	0.628
HH56ML1 57	4	22.384	05	10.165	4	92.472	5	35.596	05	0.370	5	0.226
METHYL ETHYL KETONE 3.0% 23°C												
HL01ML1 1	5	11.502	05	4.790	5	47.828	5	22.246	05	1.566	5	0.460
HL07ML1 7	5	13.435	05	2.621	5	41.940	5	3.776	05	0.575	5	2.145
HL14ML1 14	5	7.526	05	15.776	5	27.027	5	53.028	05	0.347	5	0.892
HL28ML1 28	5	3.630	05	6.709	4	37.609	5	16.800	05	1.513	5	1.621
HL56ML1 57	5	12.020	05	16.514	5	47.470	5	52.502	05	0.526	5	0.534
METHYL ETHYL KETONE 13.0% 50°C												
HH01MM1 1	5	25.336	05	10.872	5	99.713	5	36.182	05	0.410	5	0.374
HH07MM1 7	5	4.665	05	23.293	5	24.149	5	77.691	05	0.268	5	0.393
HH14MM1 14	5	21.535	05	16.141	5	87.355	5	58.191	05	0.836	5	0.559
HH28MM1 28	5	16.127	05	5.543	5	62.220	5	23.058	05	0.983	5	1.945
HH56MM1 57	5	10.157	05	9.690	5	45.350	5	34.184	05	0.366	5	0.268
METHYL ETHYL KETONE 13.0% 23°C												
HL01MM1 1	5	4.433	05	3.795	5	16.063	5	13.367	05	0.358	5	0.400
HL07MM1 7	5	15.539	05	16.279	5	60.684	5	57.195	05	0.272	5	0.273
HL14MM1 14	4	8.400	05	6.680	4	32.566	5	25.950	05	0.415	5	0.410
HL28MM1 28	4	13.964	05	12.818	4	51.976	5	44.760	05	1.420	5	1.204
HL56MM1 57	5	8.361	05	3.459	5	31.490	5	7.240	05	0.442	5	0.090

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				ASTM #2 OIL	SATURATED	50°C						
HH010M1 1	5	11.149	05	8.256	5	35.796	5	24.946	05	2.741	5	2.741
HH070M1 7	5	5.325	05	6.390	5	27.181	5	20.825	05	0.825	5	0.825
HH140M1 13	5	9.285	05	7.034	5	43.057	5	26.042	05	1.460	5	1.613
HH280M1 28	5	8.090	05	12.140	5	27.918	5	49.900	05	0.700	5	0.700
HH560M1 56	5	1.078	05	20.377	5	37.317	5	67.188	05	1.230	5	0.800
				ASTM #2 OIL	SATURATED	23°C						
HL010M1 1	5	4.419	05	3.279	5	30.479	5	13.176	05	0.746	5	0.835
HL070M1 7	5	5.589	05	11.885	5	19.001	5	42.486	05	2.620	5	1.262
HL140M1 13	5	5.835	05	60.729	5	23.848	5	******	05	1.370	5	0.850
HL280M1 28	5	11.692	05	12.939	5	46.905	5	27.026	05	1.000	5	0.600
HL560M1 56	5	12.172	05	14.160	5	34.738	5	43.142	05	0.646	5	0.969
				ASTM #2 OIL	100.0%	50°C						
HH010P1 1	5	9.722	05	3.394	5	41.716	5	14.332	05	0.867	5	0.129
HH070P1 7	5	7.029	00	*	5	25.612	0	*	05	1.100	5	0.400
HH140P1 14	4	16.093	05	6.529	4	72.129	5	31.927	05	0.200	5	0.100
HH280P1 28	3	9.100	05	8.698	3	30.300	5	28.321	05	0.168	5	0.501
HH560P1 56	5	5.408	05	6.509	5	33.572	5	17.936	05	0.268	5	0.740
				ASTM #2 OIL	100.0%	23°C						
HL010P1 1	5	9.181	05	8.198	5	42.621	5	27.571	05	1.692	5	1.973
HL070P1 7	5	5.032	05	9.226	5	16.616	5	31.620	05	0.600	5	0.500
HL140P1 14	5	11.637	05	14.545	5	47.970	5	5.486	05	0.500	5	0.700
HL280P1 28	5	2.907	05	4.286	5	11.263	5	10.343	00	*	5	2.008
HL560P1 56	5	3.885	05	13.499	5	10.772	5	49.505	05	0.860	5	1.205
				PHENOL 8.0%	50°C							
HH01PH1 1	5	6.298	05	12.800	5	20.700	5	43.300	05	0.300	5	0.360
HH07PH1 7	5	4.600	05	15.300	5	22.200	5	55.100	05	0.220	5	1.000
HH14PH1 14	5	5.540	05	14.260	5	26.700	5	43.400	05	0.414	5	0.250
HH28PH1 28	5	4.817	05	4.240	5	18.500	5	21.870	05	0.820	5	0.460
HH56PH1 56	5	8.500	05	5.820	5	34.400	5	32.800	05	0.250	5	0.370
				PHENOL 8.0%	23°C							
HL01PH1 1	5	4.200	05	8.800	5	29.100	5	18.600	05	0.900	5	0.400
HL07PH1 7	5	4.030	05	10.500	5	18.500	5	54.000	05	0.500	5	0.800
HL14PH1 14	5	3.700	05	8.500	5	16.300	5	29.600	05	1.040	5	2.300
HL28PH1 28	5	10.500	05	3.700	5	38.300	5	16.800	05	0.750	5	0.380
HL56PH1 56	5	3.610	05	5.480	5	17.000	5	17.400	05	0.660	5	0.400

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				PHENOL 1.0% 50°C								
HH01PL1 1	5	7.300	05	7.800	5	33.500	5	28.000	05	0.740	5	0.100
HH07PL1 7	5	0.320	05	5.100	5	18.000	5	8.000	05	0.350	5	2.500
HH14PL1 14	5	5.700	05	7.300	5	24.900	5	12.400	05	0.540	5	1.200
HH28PL1 28	5	8.300	05	7.300	5	31.000	5	26.100	05	0.740	5	0.460
HH56PL1 56	5	12.400	05	7.600	5	48.100	5	24.600	05	0.300	5	0.200
				PHENOL 1.0% 23°C								
HL01PL1 1	5	3.800	05	12.400	5	23.400	5	36.600	05	0.450	5	0.540
HL07PL1 7	5	11.100	05	10.400	5	47.700	5	33.000	05	0.500	5	0.700
HL14PL1 14	5	5.410	05	1.480	5	19.900	5	8.790	05	0.525	5	0.800
HL28PL1 28	5	4.680	05	7.680	5	18.600	5	27.900	05	0.643	5	1.000
HL56PL1 56	5	5.100	05	4.940	5	25.000	5	16.300	05	1.200	5	0.700
				PHENOL 4.0% 50°C								
HH01PM1 1	5	8.300	05	6.100	5	48.800	5	18.700	05	0.340	5	0.340
HH07PM1 7	5	12.400	05	3.320	5	44.800	5	15.700	05	0.490	5	0.700
HH14PM1 14	5	9.700	05	2.600	5	25.600	5	12.400	05	1.070	0	*
HH28PM1 28	5	5.940	05	10.400	5	23.600	5	35.000	05	0.450	5	0.500
HH56PM1 56	5	11.900	05	2.860	5	39.800	5	8.680	05	0.370	5	1.250
				PHENOL 4.0% 23°C								
HL01PM1 1	5	4.760	05	6.900	5	14.700	5	29.290	05	0.340	5	1.300
HL07PM1 7	5	14.500	05	4.690	5	56.500	5	17.600	05	0.800	5	0.700
HL14PM1 14	5	3.700	05	4.900	5	19.000	5	14.800	05	0.770	5	0.470
HL28PM1 28	5	14.720	05	8.000	5	65.000	5	27.000	05	0.500	5	0.500
HL56PM1 56	5	2.490	05	5.670	5	20.600	5	17.100	05	1.540	5	1.370
				SODIUM CHLORIDE 35.0% 50°C								
HH01SH1 1	5	26.950	05	25.640	5	97.020	5	99.300	05	0.420	5	0.460
HH07SH1 7	5	20.490	05	7.130	5	******	5	23.300	05	0.500	5	0.630
HH14SH1 14	5	9.600	05	4.590	5	34.400	5	15.560	05	1.660	5	0.970
HH28SH1 28	5	12.500	05	30.100	5	49.080	5	96.930	05	0.430	5	0.830
HH56SH1 56	5	5.150	05	11.850	5	27.200	5	46.050	05	0.410	5	0.250
				SODIUM CHLORIDE 35.0% 23°C								
HL01SH1 1	5	17.170	05	8.930	5	68.880	5	31.150	05	0.520	5	0.630
HL07SH1 7	5	13.180	05	9.640	5	45.400	5	33.120	05	0.370	5	0.310
HL14SH1 14	5	8.090	05	17.580	5	29.400	5	66.890	05	0.850	5	1.220
HL28SH1 28	5	13.440	05	5.130	5	51.040	5	13.170	05	0.620	5	0.700
HL56SH1 56	5	16.650	05	16.500	5	71.330	5	72.880	05	0.210	5	0.670

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
SODIUM CHLORIDE 10.0% 50°C												
HH01SM2 1	0	*	00	*	0	*	0	*	00	*	0	*
HH01SM1 1	5	4.640	05	7.170	5	23.750	5	22.470	05	0.692	5	1.157
HH07SM1 7	5	7.170	05	15.370	5	31.750	5	55.940	05	0.550	5	0.660
HH07SM2 7	0	*	05	2.960	0	*	0	*	00	*	0	*
HH14SM1 14	5	6.730	05	4.710	5	27.930	5	15.800	05	0.264	5	0.555
HH14SM2 15	0	*	00	*	0	*	0	*	00	*	0	*
HH28SM2 28	0	*	00	*	0	*	0	*	00	*	0	*
HH28SM1 28	5	23.000	05	5.320	5	81.830	5	19.630	05	1.800	5	1.130
HH56SM2 56	0	*	00	*	0	*	0	*	00	*	0	*
HH56SM1 61	5	15.790	05	14.680	5	65.250	5	54.320	05	0.610	5	1.130
SODIUM CHLORIDE 10.0% 23°C												
HL01SM1 1	5	10.030	05	1.730	5	85.370	5	6.840	05	0.740	5	1.300
HL01SM2 1	0	*	00	*	0	*	0	*	00	*	0	*
HL07SM2 7	5	*	00	*	0	*	0	*	00	*	0	*
HL07SM1 7	5	14.860	05	2.960	5	65.570	5	13.090	05	0.690	5	0.670
HL14SM1 14	5	10.380	05	11.120	5	37.710	5	21.770	05	0.640	5	0.710
HL14SM2 15	0	*	00	*	0	*	0	*	00	*	0	*
HL28SM2 28	0	*	00	*	0	*	0	*	00	*	0	*
HL28SM1 28	5	21.000	05	3.770	5	77.030	5	15.110	05	0.730	5	0.860
HL56SM2 56	0	*	00	*	0	*	0	*	00	*	0	*
HL56SM1 61	5	7.350	05	7.300	5	33.290	5	27.990	05	0.590	5	1.190
WATER 100.0% 50°C												
HH01WP2 1	0	*	00	*	0	*	0	*	00	*	0	*
HH01WP1 1	5	17.420	05	5.640	5	66.240	4	27.700	05	0.760	5	0.870
HH07WP1 7	5	15.120	05	4.630	5	49.540	5	19.240	05	0.820	5	1.620
HH07WP2 7	0	*	00	*	0	*	0	*	00	*	0	*
HH14WP2 14	0	*	00	*	0	*	0	*	00	*	0	*
HH14WP1 14	7	11.700	07	12.400	7	34.600	7	73.700	05	0.450	5	0.460
HH28WP1 28	5	5.350	05	4.220	5	23.650	5	15.230	05	0.990	5	1.910
HH28WP2 28	5	8.910	05	17.770	5	50.590	5	68.810	05	0.410	5	0.700
HH56WP2 56	0	*	00	*	0	*	0	*	00	*	0	*
HH56WP1 56	5	13.200	07	17.780	5	51.900	7	48.530	05	0.710	5	0.950
WATER 100.0% 23°C												
HL01WP1 1	5	8.030	05	12.940	5	38.450	5	46.950	05	1.570	5	0.700
HL01WP2 1	0	*	00	*	0	*	0	*	00	*	0	*
HL07WP2 7	0	*	00	*	0	*	0	*	00	*	0	*
HL07WP1 7	5	9.840	05	2.990	5	39.550	5	9.610	05	0.780	5	0.730
HL14WP1 14	7	21.000	07	21.300	7	81.000	7	7*	05	1.100	5	0.300
HL14WP2 14	0	*	00	*	0	*	0	*	00	*	0	*
HL28WP1 28	5	10.250	05	3.980	5	44.760	5	9.570	05	0.610	5	0.780
HL28WP2 28	5	2.990	05	10.600	5	9.610	5	41.100	05	1.060	5	0.710
HL56WP2 56	0	*	00	*	0	*	0	*	00	*	0	*
HL56WP1 56	5	5.540	05	11.870	5	26.030	5	46.470	05	1.340	5	1.220

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				POTASSIUM DICHROMATE 10.0% 50°C								
HH01XM1 1	5	28.480	05	12.350	5	*	5	44.320	05	0.390	5	0.500
HH07XM1 7	5	8.960	05	10.440	5	31.200	5	31.810	05	0.840	5	1.100
HH14XM1 14	5	11.160	05	15.250	5	36.840	5	51.410	05	1.650	5	1.280
HH28XM1 28	5	10.200	05	5.250	5	44.800	5	21.680	05	0.190	5	0.480
HH56XM1 55	5	15.230	05	9.780	5	58.540	5	38.210	05	0.590	5	0.440
				POTASSIUM DICHROMATE 10.0% 23°C								
HL01XM1 1	5	10.450	05	8.680	5	42.490	5	32.820	05	0.390	5	0.380
HL07XM1 7	5	7.340	05	13.250	5	30.050	5	47.000	05	0.470	5	0.980
HL14XM1 14	5	9.800	05	6.890	5	34.910	5	23.360	05	1.790	5	1.720
HL28XM1 28	5	17.390	05	2.890	5	94.290	5	12.050	05	0.440	5	0.490
HL56XM1 55	5	9.980	05	5.050	5	39.160	5	19.470	05	1.060	5	0.970

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER VS M	STD DEV YIELD M	NUMBER VS T	STD DEV YIELD T	NUMBER EV M	STD DEV ELYLD M	NUMBER EV T	STD DEV ELYLD T
HYDROCHLORIC ACID 10.0% 50°C								
HH01AM1 1	5	*	5	*	5	*	5	*
HH01AM2 1	5	1.800	5	1.190	5	0.800	5	0.700
HH07AM2 7	5	0.850	5	1.700	5	0.300	5	0.500
HH07AM1 7	5	*	5	*	5	*	5	*
HH14AM1 14	5	*	5	*	5	*	5	*
HH14AM2 14	5	2.790	5	1.150	5	1.400	5	0.700
HH28AM1 29	5	*	5	*	5	*	5	*
HH28AM2 29	5	2.640	5	2.500	5	1.000	5	0.800
HH56AM1 56	5	*	5	*	5	*	5	*
HH56AM2 56	5	2.220	5	3.390	5	1.100	5	0.700
HYDROCHLORIC ACID 10.0% 23°C								
HL01AM2 1	5	1.600	5	1.430	5	0.400	5	0.400
HL01AM1 1	5	*	5	*	5	*	5	*
HL07AM2 7	5	0.330	5	3.000	5	0.300	5	0.400
HL07AM1 7	5	*	5	*	5	*	5	*
HL14AM2 14	5	2.310	5	1.850	5	1.000	5	0.900
HL14AM1 14	5	*	5	*	5	*	5	*
HL28AM1 29	5	*	5	*	5	*	5	*
HL28AM2 29	5	7.110	5	0.870	5	0.500	5	0.300
HL56AM1 56	5	*	5	*	5	*	5	*
HL56AM2 56	5	2.590	5	2.070	5	0.800	5	0.300
SODIUM HYDROXIDE 10.0% 50°C								
HH01BM1 1	5	2.380	5	2.390	5	1.000	5	0.600
HH07BM1 7	5	1.480	5	3.700	5	0.300	5	0.500
HH14BM1 13	5	1.480	5	1.390	5	1.100	5	0.800
HH28BM1 28	5	2.150	5	2.280	5	0.300	5	0.500
HH56BM1 56	5	1.150	5	2.330	5	0.800	5	0.400
SODIUM HYDROXIDE 10.0% 23°C								
HL01BM1 1	5	*	5	*	5	*	5	*
HL07BM1 7	5	0.830	5	2.260	5	0.700	5	0.900
HL14BM1 14	5	*	5	1.990	5	*	5	1.600
HL28BM1 28	5	*	5	*	5	*	5	*
HL56BM1 56	5	1.080	5	0.690	5	0.300	5	0.400
1 2 DICHLOROETHANE .8% 50°C								
HH01DH1 1	5	0.750	5	1.720	5	2.100	5	1.670
HH07DH1 7	5	0.804	5	1.500	5	0.550	5	1.400
HH14DH1 14	5	1.812	5	2.300	5	2.100	5	2.400

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER VS M	STD DEV VIELD M	NUMBER VS T	STD DEV VIELD T	NUMBER EY M	STD DEV ELYLD M	NUMBER EY T	STD DEV ELYLD T
			1 2 DICHLOROETHANE	.8% 50°C				
HH28DH1 28	5	1.120	5	0.730	5	0.930	5	0.800
HH56DH1 56	5	*	5	*	5	*	5	*
			1 2 DICHLOROETHANE	.8% 23°C				
HL01DH1 1	5	2.120	5	0.390	5	0.900	5	0.010
HL07DH1 7	5	1.720	5	3.600	5	0.400	5	1.500
HL14DH1 14	5	1.560	5	1.780	5	1.500	5	1.700
HL28DH1 28	5	1.820	5	2.750	5	1.500	5	1.400
HL56DH1 56	5	*	5	*	5	*	5	*
			1 2 DICHLOROETHANE	.1% 50°C				
HH01DL1 1	5	3.230	5	1.720	5	1.380	5	1.550
HH07DL1 7	5	3.990	5	1.010	5	2.100	5	0.500
HH14DL1 14	5	1.450	5	3.250	5	0.500	5	0.600
HH28DL1 28	5	1.660	5	2.330	5	1.400	5	0.970
HH56DL1 56	5	*	5	*	5	*	5	*
			1 2 DICHLOROETHANE	.1% 23°C				
HL01DL1 1	5	0.740	5	1.350	5	1.360	5	0.690
HL07DL1 7	5	2.500	5	1.100	5	4.600	5	3.400
HL14DL1 14	5	2.340	5	1.570	5	1.400	5	0.600
HL28DL1 28	5	1.068	5	2.060	5	0.700	5	0.600
HL56DL1 56	5	*	5	*	5	*	5	*
			1 2 DICHLOROETHANE	.5% 50°C				
HH01DM1 1	5	0.750	5	3.030	5	1.300	5	1.400
HH07DM1 7	5	1.600	5	1.900	5	2.400	5	2.300
HH14DM1 14	5	1.600	5	1.240	5	2.500	5	2.000
HH28DM1 28	5	1.400	5	0.930	5	1.400	5	1.100
HH56DM1 56	5	*	5	*	5	*	5	*
			1 2 DICHLOROETHANE	.5% 23°C				
HL01DM1 1	5	1.700	5	1.400	5	1.600	5	0.800
HL07DM1 7	5	2.311	5	2.333	5	1.200	5	*
HL14DM1 14	5	0.700	5	0.800	5	1.800	5	0.800
HL28DM1 28	5	1.900	5	1.300	5	0.900	5	1.000
HL56DM1 56	5	*	5	*	5	*	5	*

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER YS M	STD DEV YIELD M	NUMBER YS T	STD DEV YIELD T	NUMBER EY M	STD DEV ELYLD M	NUMBER EY T	STD DEV ELYLD T
			FURFURAL 8.0% 50°C					
HH01FH1 1	5	2.630	5	2.450	5	0.004	5	0.300
HH07FH1 7	5	1.860	5	2.290	5	0.400	5	0.400
HH14FH1 14	5	0.690	5	2.880	5	0.400	5	0.700
HH28FH1 28	5	0.920	5	0.800	5	1.300	5	0.400
HH56FH1 56	5	3.490	5	2.440	5	1.100	5	0.900
			FURFURAL 8.0% 23°C					
HL01FH1 1	5	3.350	5	1.340	5	0.400	5	0.600
HL07FH1 7	5	0.280	5	1.000	5	0.500	5	0.400
HL14FH1 14	5	0.462	5	1.690	5	0.400	5	0.400
HL28FH1 28	5	2.230	5	0.570	5	0.570	5	1.000
HL56FH1 56	5	1.440	5	1.010	5	0.900	5	0.200
			FURFURAL 1.0% 50°C					
HH01FL1 1	5	2.582	5	0.780	5	0.600	5	0.400
HH07FL1 7	5	1.730	5	1.880	5	0.100	5	0.400
HH14FL1 14	5	3.180	5	2.200	5	0.140	5	0.140
HH28FL1 28	5	1.400	5	1.670	5	0.500	5	1.500
HH56FL1 56	5	1.410	5	2.440	5	0.400	5	0.400
			FURFURAL 1.0% 23°C					
HL01FL1 1	5	2.580	5	0.780	5	1.000	5	0.500
HL07FL1 7	5	2.000	5	0.980	5	0.090	5	0.040
HL14FL1 14	5	4.210	5	2.160	5	0.022	5	0.090
HL28FL2 28	5	3.170	5	4.230	5	0.090	5	*
HL28FL1 28	5	*	5	*	5	*	5	*
HL56FL1 56	5	1.150	5	3.010	5	*	5	0.800
			FURFURAL 4.0% 50°C					
HH01FM1 1	5	0.660	5	4.870	5	0.400	5	0.100
HH07FM1 7	5	0.570	5	1.620	5	0.090	5	4.000
HH14FM1 14	5	0.690	5	1.010	5	0.400	5	0.400
HH28FM1 28	5	*	5	0.680	5	0.400	5	1.200
HH56FM1 56	5	1.440	5	1.620	5	0.040	5	0.400
			FURFURAL 4.0% 23°C					
HL01FM1 1	5	2.270	5	1.480	5	0.400	5	0.900
HL07FM1 7	5	1.150	5	1.410	5	0.400	5	*
HL14FM1 14	5	1.410	5	1.410	5	1.600	5	*
HL28FM1 28	5	0.610	5	2.390	5	0.001	5	1.000
HL56FM1 56	5	1.670	5	2.000	5	0.400	5	0.800

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER YS M	STD DEV YIELD M	NUMBER YS T	STD DEV YIELD T	NUMBER EV M	STD DEV ELYLD M	NUMBER EV T	STD DEV ELYLD T
			METHYL ETHYL KETONE 26.0% 50°C					
HH01MH1 1	5	2.160	5	0.800	5	*	5	1.700
HH07MH1 7	5	2.580	5	2.340	5	0.600	5	0.600
HH14MH1 14	5	2.570	5	1.110	5	1.000	5	0.800
HH28MH1 28	5	3.090	5	2.150	5	0.700	5	0.400
HH56MH1 57	5	5.580	5	2.090	5	0.400	5	0.700
			METHYL ETHYL KETONE 26.0% 23°C					
HL01MH1 1	5	2.620	5	0.590	5	0.400	5	0.400
HL07MH1 7	5	2.050	5	1.000	5	1.600	5	0.400
HL14MH1 14	5	3.590	5	2.150	5	0.400	5	0.600
HL28MH1 28	5	1.730	5	2.420	5	0.300	5	0.400
HL56MH1 57	5	1.890	5	1.040	5	0.400	5	0.600
			METHYL ETHYL KETONE 3.0% 50°C					
HH01ML1 1	5	0.780	5	3.730	5	0.600	5	0.600
HH07ML1 7	5	3.160	5	3.430	5	0.060	5	0.040
HH14ML1 14	5	1.730	5	1.660	5	0.600	5	0.400
HH28ML1 28	5	0.960	5	1.720	5	0.700	5	2.590
HH56ML1 57	5	3.630	5	3.630	5	0.600	5	1.000
			METHYL ETHYL KETONE 3.0% 23°C					
HL01ML1 1	5	1.480	5	2.030	5	0.300	5	0.800
HL07ML1 7	5	2.860	5	3.680	5	0.500	5	0.400
HL14ML1 14	5	3.240	5	1.480	5	0.300	5	0.600
HL28ML1 28	5	1.440	5	3.630	5	0.600	5	0.300
HL56ML1 57	5	2.830	5	4.510	5	0.800	5	0.900
			METHYL ETHYL KETONE 13.0% 50°C					
HH01MM1 1	5	4.360	5	2.590	5	1.400	5	0.400
HH07MM1 7	5	1.650	5	0.610	5	0.700	5	0.300
HH14MM1 14	5	1.220	5	3.330	5	0.500	5	0.900
HH28MM1 28	5	1.560	5	0.780	5	0.900	5	0.400
HH56MM1 57	5	1.060	5	2.880	5	0.300	5	0.700
			METHYL ETHYL KETONE 13.0% 23°C					
HL01MM1 1	5	2.390	5	1.930	5	0.300	5	0.900
HL07MM1 7	5	1.520	5	2.340	5	0.400	5	0.700
HL14MM1 14	5	1.480	5	1.600	5	1.100	5	0.600
HL28MM1 28	5	*	5	6.730	5	0.600	5	0.600
HL56MM1 57	5	2.350	5	4.160	5	0.400	5	0.700

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER VS M	STD DEV YIELD M	NUMBER VS T	STD DEV YIELD T	NUMBER EV M	STD DEV ELYLD M	NUMBER EV T	STD DEV ELYLD T
ASTM #2 OIL SATURATED 50°C								
HH01OM1 1	5	0.440	5	1.440	5	0.700	5	0.600
HH07OM1 7	5	1.430	5	2.350	5	0.600	5	0.300
HH14OM1 13	5	1.490	5	1.890	5	0.400	5	0.900
HH28OM1 28	5	*	5	*	5	*	5	*
HH56OM1 56	5	0.770	5	1.630	5	0.400	5	0.400
ASTM #2 OIL SATURATED 23°C								
HL01OM1 1	5	1.150	5	1.660	5	0.900	5	0.400
HL07OM1 7	5	0.720	5	0.830	5	0.900	5	0.600
HL14OM1 13	5	1.150	5	1.480	5	0.700	5	0.400
HL28OM1 28	5	*	5	*	5	*	5	*
HL56OM1 56	5	5.020	5	4.770	5	1.000	5	0.800
ASTM #2 OIL 100.0% 50°C								
HH01OP1 1	5	1.790	5	1.760	5	1.000	5	0.800
HH07OP1 7	5	1.000	5	*	5	0.400	5	*
HH14OP1 14	5	2.880	5	1.670	5	0.800	5	0.600
HH28OP1 28	5	1.010	5	0.610	5	0.800	5	0.500
HH56OP1 56	5	3.210	5	2.070	5	0.300	5	1.000
ASTM #2 OIL 100.0% 23°C								
HL01OP1 1	5	2.500	5	2.620	5	0.400	5	*
HL07OP1 7	5	1.210	5	1.150	5	0.600	5	0.300
HL14OP1 14	5	0.870	5	0.780	5	1.200	5	0.300
HL28OP1 28	5	1.310	5	0.570	5	1.000	5	*
HL56OP1 56	5	2.240	5	2.850	5	0.500	5	*
PHENOL 8.0% 50°C								
HH01PH1 1	5	3.820	5	2.800	5	0.400	5	1.100
HH07PH1 7	5	1.190	5	2.210	5	1.900	5	0.890
HH14PH1 14	5	2.110	5	3.810	5	0.480	5	2.060
HH28PH1 28	5	1.010	5	3.010	5	1.640	5	0.840
HH56PH1 56	5	1.350	5	1.070	5	0.900	5	0.980
PHENOL 8.0% 23°C								
HL01PH1 1	5	1.660	5	2.180	5	0.700	5	1.000
HL07PH1 7	5	1.560	5	3.840	5	1.100	5	1.500
HL14PH1 14	5	0.840	5	1.850	5	0.085	5	0.086
HL28PH1 28	5	0.400	5	2.500	5	0.900	5	0.500
HL56PH1 56	5	2.310	5	1.980	5	0.500	5	1.100

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER VS M	STD DEV YIELD M	NUMBER VS T	STD DEV YIELD T	NUMBER EV M	STD DEV ELYLD M	NUMBER EV T	STD DEV ELYLD T
			PHENOL 1.0% 50°C					
HH01PL1 1	5	3.400	5	1.760	5	1.700	5	3.600
HH07PL1 7	5	1.730	5	1.780	5	1.000	5	0.900
HH14PL1 14	5	1.350	5	2.830	5	0.500	5	1.800
HH28PL1 28	5	1.940	5	2.930	5	1.800	5	0.900
HH56PL1 56	5	2.240	5	2.270	5	1.000	5	0.500
			PHENOL 1.0% 23°C					
HL01PL1 1	5	1.333	5	3.690	5	1.460	5	0.700
HL07PL1 7	5	1.210	5	1.541	5	0.510	5	0.130
HL14PL1 14	5	0.950	5	0.730	5	1.820	5	1.500
HL28PL1 28	5	1.940	5	2.720	5	0.620	5	1.760
HL56PL1 56	5	2.370	5	1.540	5	0.800	5	1.000
			PHENOL 4.0% 50°C					
HH01PM1 1	5	0.950	5	1.560	5	1.000	5	0.970
HH07PM1 7	5	1.310	5	1.960	5	0.700	5	0.870
HH14PM1 14	5	4.700	5	2.030	5	2.100	5	1.200
HH28PM1 28	5	0.810	5	2.320	5	1.300	5	0.480
HH56PM1 56	5	1.720	5	0.770	5	0.930	5	0.620
			PHENOL 4.0% 23°C					
HL01PM1 1	5	1.790	5	2.350	5	1.500	5	0.380
HL07PM1 7	5	2.340	5	3.375	5	1.390	5	1.230
HL14PM1 14	5	1.800	5	1.420	5	1.500	5	1.600
HL28PM1 28	5	2.210	5	1.080	5	1.240	5	0.600
HL56PM1 56	5	1.840	5	1.890	5	1.700	5	0.920
			SODIUM CHLORIDE 35.0% 50°C					
HH01SH1 1	5	*	5	*	5	*	5	*
HH07SH1 7	5	*	5	*	5	*	5	*
HH14SH1 14	5	1.980	5	2.150	5	1.000	5	0.500
HH28SH1 28	5	0.820	5	*	5	1.300	5	*
HH56SH1 56	5	3.580	5	3.640	5	0.700	5	0.900
			SODIUM CHLORIDE 35.0% 23°C					
HL01SH1 1	5	*	5	*	5	*	5	*
HL07SH1 7	5	*	5	*	5	*	5	*
HL14SH1 14	5	1.720	5	3.340	5	1.100	5	0.800
HL28SH1 28	5	*	5	*	5	*	5	*
HL56SH1 56	5	2.890	5	0.960	5	0.700	5	0.030

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER VS M	STD DEV YIELD M	NUMBER YS T	STD DEV YIELD T	NUMBER EV M	STD DEV ELYLD M	NUMBER EV T	STD DEV ELYLD T
			SODIUM CHLORIDE 10.0% 50°C					
HH01SM2 1	5	2.410	5	1.690	5	0.700	5	1.200
HH01SM1 1	5	*	5	*	5	*	5	*
HH07SM1 7	5	*	5	*	5	*	5	*
HH07SM2 7	5	2.310	5	1.850	5	0.400	5	0.600
HH14SM1 14	5	*	5	*	5	*	5	*
HH14SM2 15	5	1.930	5	1.250	5	0.800	5	0.300
HH28SM2 28	5	0.800	5	3.280	5	7.000	5	0.700
HH28SM1 28	5	*	5	*	5	*	5	*
HH56SM2 56	5	3.290	5	1.560	5	1.200	5	0.400
HH56SM1 61	5	*	5	*	5	*	5	*
			SODIUM CHLORIDE 10.0% 23°C					
HL01SM1 1	5	*	5	*	5	*	5	*
HL01SM2 1	5	1.340	5	1.780	5	0.600	5	0.800
HL07SM1 7	5	*	5	*	5	*	5	*
HL07SM2 7	5	0.360	5	0.360	5	0.900	5	0.600
HL14SM1 14	5	*	5	*	5	*	5	*
HL14SM2 15	5	2.790	5	2.880	5	0.800	5	0.700
HL28SM2 28	5	1.150	5	1.680	5	0.600	5	0.600
HL28SM1 28	5	*	5	*	5	*	5	*
HL56SM2 56	5	2.050	5	2.940	5	0.300	5	0.600
HL56SM1 61	5	*	5	*	5	*	5	*
			WATER 100.0% 50°C					
HH01WP2 1	5	2.430	5	2.410	5	0.400	5	0.600
HH01WP1 1	5	*	5	*	5	*	5	*
HH07WP1 7	5	*	5	*	5	*	5	*
HH07WP2 7	5	0.910	5	1.280	5	1.000	5	0.700
HH14WP1 14	5	3.000	5	1.950	5	*	5	*
HH14WP2 14	5	3.710	5	1.430	5	0.300	5	0.700
HH28WP2 28	5	*	5	*	5	*	5	*
HH28WP1 28	5	*	5	*	5	*	5	*
HH56WP2 56	5	2.380	5	1.710	5	0.800	5	0.700
HH56WP1 56	5	*	5	*	5	*	5	*
			WATER 100.0% 23°C					
HL01WP1 1	5	*	5	*	5	*	5	*
HL01WP2 1	5	1.780	5	3.500	5	0.700	5	0.500
HL07WP2 7	5	0.750	5	1.100	5	0.500	5	1.000
HL07WP1 7	5	*	5	*	5	*	5	*
HL14WP1 14	5	3.500	5	4.800	5	*	5	*
HL14WP2 14	5	2.170	5	2.010	5	0.700	5	0.030

HIGH DENSITY POLYETHYLENE: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER YS M	STD DEV YIELD M	NUMBER YS T	STD DEV YIELD T	NUMBER EY M	STD DEV ELYLD M	NUMBER EY T	STD DEV ELYLD T
WATER 100.0% 23°C								
HL28WP2 28	5	*	5	*	5	*	5	*
HL28WP1 28	5	*	5	*	5	*	5	*
HL56WP2 56	5	1.760	5	2.480	5	0.900	5	*
HL56WP1 56	5	*	5	*	5	*	5	*
POTASSIUM DICHROMATE 10.0% 50°C								
HH01XM1 1	5	1.410	5	3.260	5	0.300	5	1.000
HH07XM1 7	5	1.610	5	3.250	5	0.600	5	0.400
HH14XM1 14	5	2.030	5	0.830	5	1.000	5	0.600
HH28XM1 28	5	0.860	5	1.850	5	0.700	5	0.600
HH56XM1 55	5	1.370	5	2.120	5	1.500	5	0.100
POTASSIUM DICHROMATE 10.0% 23°C								
HL01XM1 1	5	1.020	5	3.480	5	0.500	5	1.000
HL07XM1 7	5	3.400	5	2.860	5	0.700	5	0.800
HL14XM1 14	5	0.400	5	2.960	5	1.600	5	0.900
HL28XM1 28	5	0.690	5	1.250	5	0.600	5	0.900
HL56XM1 55	5	2.410	5	1.060	5	0.900	5	0.900

HDPE : RETENTION OF PROPERTIES

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
HYDROCHLORIC ACID 10.0% 50°C									
HH01AM1 1	.8	.6	.9	*	*	*	*	*	*
HH01AM2 1	.3	.3	.3	95	100	103	95	101	108
HH07AM2 7	2.7	.3	.4	101	107	96	92	93	87
HH07AM1 7	.2	*	.1	*	*	*	*	*	*
HH14AM1 14	1.1	1.7	1.7	*	*	*	*	*	*
HH14AM2 14	1.3	*	*	94	97	103	89	98	93
HH99AM1 28	.4	1.6	1.5	*	*	*	*	*	*
HH28AM1 29	*	*	.1	*	*	*	*	*	*
HH28AM2 29	100.0	100.0	100.0	109	108	96	92	109	110
HH56AM1 56	.1	2.9	2.9	*	*	*	*	*	*
HH56AM2 56	.3	1.7	2.1	118	112	98	90	102	101
HH99AM2 144	.3	1.9	2.0	*	*	*	*	*	*
HH99AM3 252	.1	1.3	1.3	*	*	*	*	*	*
HH99AM4 368	.4	3.8	4.1	*	*	*	*	*	*
HH99AM5 511	.4	1.0	1.1	*	*	*	*	*	*
HH99AM6 621	.4	*	10.8	*	*	*	*	*	*
HH99AM7 770	.3	2.2	2.4	110	*	112	*	*	*
HYDROCHLORIC ACID 10.0% 23°C									
HL01AM2 1	*	.3	.2	100	110	105	84	102	91
HL01AM1 1	.1	.6	.4	*	*	*	*	*	*
HL07AM2 7	.3	1.0	.9	113	102	92	74	93	97
HL07AM1 7	.2	*	.1	*	*	*	*	*	*
HL14AM2 14	.1	1.3	1.5	99	107	94	87	112	91
HL14AM1 14	*	1.0	1.0	*	*	*	*	*	*
HL99AM1 28	*	1.0	1.1	*	*	*	*	*	*
HL28AM1 29	.1	*	.1	*	*	*	*	*	*
HL28AM2 29	100.0	100.0	100.0	108	109	97	91	104	107
HL56AM2 56	.2	1.4	1.5	104	110	94	83	96	98
HL56AM1 56	.1	4.2	4.5	*	*	*	*	*	*
HL99AM2 144	.4	2.0	1.8	*	*	*	*	*	*
HL99AM3 238	.1	.3	.8	*	*	*	*	*	*
HL99AM4 368	.9	1.6	2.1	*	*	*	*	*	*
HL99AM5 511	.1	2.6	2.5	*	*	*	*	*	*
HL99AM6 621	.1	.3	1.0	*	*	*	*	*	*
HL99AM7 768	.2	.3	*	99	*	97	*	*	*
SODIUM HYDROXIDE 10.0% 50°C									
HH01BM1 1	*	.3	.4	123	118	89	88	114	103
HH07BM1 7	*	4.5	4.4	108	109	96	98	88	87
HH14BM1 13	*	.6	.8	101	98	94	89	98	101
HH28BM1 28	.3	.3	.2	108	107	103	94	87	89
HH99BM1 29	*	1.3	1.0	*	*	*	*	*	*
HH56BM1 56	.1	*	*	100	107	106	95	89	98
HH99BM2 144	.9	*	.3	*	*	*	*	*	*
HH99BM3 252	.6	1.7	1.5	*	*	*	*	*	*
HH99BM4 368	.5	1.7	100.0	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
SODIUM HYDROXIDE 10.0% 50°C									
HH99BM5 510	.4	*	.5	*	*	*	*	*	*
HH99BM6 622	.2	25.1	25.3	*	*	*	*	*	*
HH99BM7 770	.2	1.7	2.0	107	*	109	*	*	*
SODIUM HYDROXIDE 10.0% 23°C									
HL01BM1 1	*	.3	.4	*	*	*	*	*	*
HL07BM1 7	*	*	.1	104	108	94	79	102	111
HL14BM1 14	*	.3	.4	*	108	*	85	*	116
HL28BM1 28	.1	*	.1	*	*	*	*	*	*
HL99BM1 28	.8	*	.1	*	*	*	*	*	*
HL56BM1 56	.1	1.2	1.2	108	97	103	93	95	104
HL99BM2 144	.4	.7	.3	*	*	*	*	*	*
HL99BM3 238	.4	2.0	2.3	*	*	*	*	*	*
HL99BM4 368	1.0	2.9	3.5	*	*	*	*	*	*
HL99BM5 510	.2	.7	.6	*	*	*	*	*	*
HL99BM6 622	.2	6.2	6.9	*	*	*	*	*	*
HL99BM7 768	.4	2.9	2.9	105	*	110	*	*	*
1 2 DICHLOROETHANE .8% 50°C									
HH01DH1 1	3.4	*	1.2	89	91	123	103	88	88
HH07DH1 7	2.7	.3	.8	89	91	106	96	102	101
HH14DH1 14	4.2	3.5	4.6	92	91	116	132	92	86
HH28DH1 28	2.9	*	1.1	90	92	130	108	90	91
HH99DH1 28	1.1	.7	1.5	*	*	*	*	*	*
HH56DH1 56	1.0	100.0	100.0	*	*	*	*	*	*
HH99DH2 133	.5	*	.3	*	*	*	*	*	*
HH99DH3 244	2.4	1.0	1.7	*	*	*	*	*	*
HH99DH4 364	.8	2.0	2.7	*	*	*	*	*	*
HH99DH5 495	.5	2.9	3.0	*	*	*	*	*	*
HH99DH6 629	.5	5.9	6.3	*	*	*	*	*	*
HH99DH7 763	1.0	4.6	5.1	107	*	103	*	*	*
1 2 DICHLOROETHANE .8% 23°C									
HL01DH1 1	2.8	.3	.8	86	91	115	105	90	94
HL07DH1 7	1.8	.6	.3	91	90	119	108	93	97
HL14DH1 14	3.7	.3	1.1	89	89	119	112	97	93
HL99DH1 28	1.0	1.3	.8	*	*	*	*	*	*
HL28DH1 28	2.0	1.4	2.4	87	90	115	99	95	90
HL56DH1 56	2.4	.3	.7	*	*	*	*	*	*
HL99DH2 134	1.6	1.3	.5	*	*	*	*	*	*
HL99DH3 231	1.3	*	1.6	*	*	*	*	*	*
HL99DH4 364	.8	.3	.8	*	*	*	*	*	*
HL99DH5 495	.9	1.3	.9	*	*	*	*	*	*
HL99DH6 630	1.1	2.6	2.4	*	*	*	*	*	*
HL99DH7 761	1.4	6.4	5.9	105	*	112	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
1 2 DICHLOROETHANE .1% 50°C									
HH01DL1 1	.7	.7	.6	89	89	112	106	90	92
HH07DL1 7	.5	.6	.8	89	93	115	102	97	104
HH14DL1 14	1.7	.7	.5	88	92	118	108	92	88
HH99DL1 28	.3	*	.3	*	*	*	*	*	*
HH28DL1 28	.3	*	*	87	93	123	107	87	102
HH56DL1 56	.3	.6	.7	*	*	*	*	*	*
HH99DL2 139	.4	1.3	1.6	*	*	*	*	*	*
HH99DL3 246	.9	1.0	1.2	*	*	*	*	*	*
HH99DL4 370	.2	1.0	1.5	*	*	*	*	*	*
HH99DL5 496	.1	1.6	2.4	*	*	*	*	*	*
HH99DL6 631	.1	2.9	2.1	*	*	*	*	*	*
HH99DL7 765	.1	4.5	3.6	105	*	111	*	*	*
1 2 DICHLOROETHANE .1% 23°C									
HL01DL1 1	.3	.7	.5	92	94	106	104	92	96
HL07DL1 7	.5	.6	.6	94	97	147	94	94	93
HL14DL1 14	5.8	*	.1	92	95	118	105	95	101
HL99DL1 28	.3	2.5	2.5	*	*	*	*	*	*
HL28DL1 28	.5	.3	.4	86	92	115	99	93	100
HL56DL1 56	.4	.3	.4	*	*	*	*	*	*
HL99DL2 136	.9	5.3	5.3	*	*	*	*	*	*
HL99DL3 233	.3	2.8	2.4	*	*	*	*	*	*
HL99DL4 366	.2	4.7	5.2	*	*	*	*	*	*
HL99DL5 496	.2	5.0	5.3	*	*	*	*	*	*
HL99DL6 632	.3	1.6	2.1	*	*	*	*	*	*
HL99DL7 763	.4	.3	.3	103	*	99	*	*	*
1 2 DICHLOROETHANE .5% 50°C									
HH01DM1 1	2.0	.6	1.0	86	92	120	107	90	90
HH07DM1 7	1.6	.3	*	84	85	94	106	84	80
HH14DM1 14	2.1	2.0	3.2	91	90	117	106	97	85
HH28DM1 28	1.6	.3	.9	87	91	122	106	89	93
HH99DM1 28	.3	.3	.4	*	*	*	*	*	*
HH56DM1 56	1.3	1.0	.6	*	*	*	*	*	*
HH99DM3 245	4.4	.6	1.1	*	*	*	*	*	*
HH99DM4 365	.2	.3	.5	*	*	*	*	*	*
HH99DM5 496	.2	.3	.2	*	*	*	*	*	*
HH99DM6 630	.2	7.2	6.8	*	*	*	*	*	*
HH99DM7 764	.1	5.6	5.4	112	*	108	*	*	*
1 2 DICHLOROETHANE .5% 23°C									
HL01DM1 1	1.7	.6	1.1	91	93	115	102	99	95
HL07DM1 7	2.0	.6	.7	88	91	101	96	86	96
HL14DM1 14	2.9	.6	.4	92	91	109	113	89	96
HL28DM1 28	1.5	*	.6	89	90	113	108	95	90
HL99DM1 28	.7	.3	.5	*	*	*	*	*	*
HL56DM1 56	1.0	*	.4	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELVLD M	PERCENT ELVLD T	PERCENT MODE M	PERCENT MODE T
			1 2 DICHLOROETHANE .5% 23°C						
HL99DM2 135	1.4	.3	1.0	*	*	*	*	*	*
HL99DM3 233	.7	1.9	3.2	*	*	*	*	*	*
HL99DM4 365	.3	2.6	3.5	*	*	*	*	*	*
HL99DM5 496	.6	1.0	1.4	*	*	*	*	*	*
HL99DM6 631	.8	4.8	5.4	*	*	*	*	*	*
HL99DM7 762	.6	3.2	3.6	109	*	112	*	*	*
			FURFURAL 8.0% 50°C						
HH01FH1 1	.3	.3	.4	96	96	100	97	92	91
HH07FH1 7	1.1	.6	.1	89	93	110	100	102	106
HH14FH1 14	1.0	.3	.1	91	95	110	103	109	111
HH28FH1 28	1.1	.3	.3	89	90	109	100	93	89
HH99FH1 28	2.2	.3	.6	*	*	*	*	*	*
HH56FH1 56	5.1	.7	.7	99	97	103	100	95	92
HH99FH2 117	1.7	.9	1.2	*	*	*	*	*	*
HH99FH3 236	1.6	.9	1.5	*	*	*	*	*	*
HH99FH4 350	1.9	1.2	1.6	*	*	*	*	*	*
HH99FH5 485	1.5	4.0	4.7	*	*	*	*	*	*
HH99FH6 616	6.5	9.9	10.9	*	*	*	*	*	*
HH99FH7 750	1.5	7.8	8.0	111	*	126	*	*	*
			FURFURAL 8.0% 23°C						
HL01FH1 1	.7	.3	.2	100	98	105	97	110	100
HL07FH1 7	.8	1.0	.6	93	93	104	98	112	109
HL14FH1 14	.8	.6	1.1	93	96	110	99	98	121
HL99FH1 28	1.3	.3	.6	*	*	*	*	*	*
HL28FH1 28	.7	3.2	3.5	90	90	107	101	93	94
HL56FH1 56	.9	*	*	92	96	106	101	91	95
HL99FH2 117	1.0	1.0	1.5	*	*	*	*	*	*
HL99FH3 219	1.1	3.5	5.3	*	*	*	*	*	*
HL99FH4 350	1.4	2.9	3.3	*	*	*	*	*	*
HL99FH5 485	3.9	4.5	6.3	*	*	*	*	*	*
HL99FH6 617	2.4	7.1	8.8	*	*	*	*	*	*
HL99FH7 748	1.5	17.1	17.5	105	*	105	*	*	*
			FURFURAL 1.0% 50°C						
HH01FL1 1	.2	4.2	4.3	99	97	106	99	98	90
HH07FL1 7	.2	.3	.2	94	96	107	100	98	110
HH14FL1 14	.3	.3	.3	91	93	110	108	*	*
HH28FL1 28	.2	.3	.3	95	98	100	99	95	78
HH99FL1 29	.2	1.9	1.9	*	*	*	*	*	*
HH56FL1 56	.4	.9	.6	94	98	106	105	105	112
HH99FL2 124	.2	1.6	1.6	*	*	*	*	*	*
HH99FL3 242	1.3	1.6	1.7	*	*	*	*	*	*
HH99FL4 356	.2	1.6	1.6	*	*	*	*	*	*
HH99FL5 489	.6	1.6	1.1	*	*	*	*	*	*
HH99FL6 622	1.5	5.6	6.4	*	*	*	*	*	*
HH99FL7 756	.5	1.2	1.0	118	*	118	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
				FURFURAL 1.0% 23°C						
HL01FL1	1	.2	4.1	4.5	99	101	101	87	103	109
HL07FL1	7	.2	.9	1.1	93	96	106	98	116	105
HL14FL1	14	.2	.3	*	93	92	104	106	*	*
HL28FL1	28	.2	.3	.3	*	*	*	*	*	*
HL28FL2	28	.2	.3	.3	91	92	104	97	*	*
HL99FL1	29	.7	.6	.7	*	*	*	*	*	*
HL56FL1	56	.3	*	.2	93	101	97	87	105	101
HL99FL2	124	.3	2.4	2.2	*	*	*	*	*	*
HL99FL3	225	.4	1.8	2.7	*	*	*	*	*	*
HL99FL4	356	.8	1.2	1.1	*	*	*	*	*	*
HL99FL5	489	.6	1.8	2.0	*	*	*	*	*	*
HL99FL6	623	.6	.3	.5	*	*	*	*	*	*
HL99FL7	754	.8	3.0	3.3	109	*	102	*	*	*
				FURFURAL 4.0% 50°C						
HH01FM1	1	.4	.6	.5	98	98	104	93	99	101
HH07FM1	7	.8	.3	.1	92	95	104	98	97	104
HH14FM1	14	.7	1.3	1.1	91	94	106	98	101	93
HH28FM1	28	.8	.6	.4	90	93	110	105	107	91
HH99FM1	29	1.5	.7	1.1	*	*	*	*	*	*
HH56FM1	56	.6	.3	.4	99	98	109	100	94	95
HH99FM2	124	2.0	1.0	1.1	*	*	*	*	*	*
HH99FM3	242	1.4	2.0	2.3	*	*	*	*	*	*
HH99FM4	356	.9	1.3	1.4	*	*	*	*	*	*
HH99FM5	490	2.1	2.9	3.6	*	*	*	*	*	*
HH99FM6	622	4.6	8.8	9.9	*	*	*	*	*	*
HH99FM7	756	1.3	.7	1.2	108	*	127	*	*	*
				FURFURAL 4.0% 23°C						
HL01FM1	1	.3	*	.4	95	101	99	92	120	107
HL07FM1	7	.7	2.7	2.2	92	94	113	97	106	121
HL14FM1	14	.7	1.7	1.6	92	94	104	97	108	102
HL28FM1	28	1.3	.3	.1	89	93	107	98	78	108
HL99FM1	29	.8	1.9	2.5	*	*	*	*	*	*
HL56FM1	56	.6	*	.1	93	93	106	92	108	108
HL99FM2	124	.8	*	.4	*	*	*	*	*	*
HL99FM3	228	1.1	3.4	5.0	*	*	*	*	*	*
HL99FM4	356	1.0	.6	1.3	*	*	*	*	*	*
HL99FM5	490	1.0	2.5	3.4	*	*	*	*	*	*
HL99FM6	623	1.7	4.0	13.1	*	*	*	*	*	*
HL99FM7	754	1.6	9.0	9.6	109	*	105	*	*	*
				METHYL ETHYL KETONE 26.0% 50°C						
HH01MH1	1	1.8	2.7	4.2	93	97	97	97	96	94
HH07MH1	7	1.9	.3	.9	96	96	101	86	87	95
HH14MH1	14	1.7	2.3	3.7	96	98	98	87	91	96
HH28MH1	28	1.4	*	.7	94	97	101	94	115	103

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
METHYL ETHYL KETONE 26.0% 50°C									
HH99MH1 29	2.1	1.0	2.5	*	*	*	*	*	*
HH56MH1 57	1.6	.3	.2	86	91	114	108	70	79
HH99MH2 122	2.1	*	1.3	*	*	*	*	*	*
HH99MH3 240	2.1	1.6	2.9	*	*	*	*	*	*
HH99MH4 358	2.2	.3	1.8	*	*	*	*	*	*
HH99MH5 493	1.5	1.0	1.5	*	*	*	*	*	*
HH99MH6 626	1.1	4.2	4.2	*	*	*	*	*	*
HH99MH7 759	.8	6.2	6.7	105	*	113	*	*	*
METHYL ETHYL KETONE 26.0% 23°C									
HL01MH1 1	.9	.6	1.2	98	100	95	90	98	112
HL07MH1 7	1.3	1.2	.1	95	97	91	84	90	99
HL14MH1 14	1.5	1.0	2.4	96	98	91	86	93	92
HL28MH1 28	1.3	.3	.2	96	95	92	85	99	93
HL99MH1 29	1.8	1.0	2.4	*	*	*	*	*	*
HL56MH1 57	1.7	.9	1.0	96	96	96	93	88	98
HL99MH2 122	2.0	.3	1.2	*	*	*	*	*	*
HL99MH3 235	1.5	1.7	3.3	*	*	*	*	*	*
HL99MH4 358	1.9	.3	1.6	*	*	*	*	*	*
HL99MH5 493	1.7	.3	1.4	*	*	*	*	*	*
HL99MH6 627	1.9	.7	1.2	*	*	*	*	*	*
HL99MH7 757	1.8	1.7	2.5	101	*	118	*	*	*
METHYL ETHYL KETONE 3.0% 50°C									
HH01ML1 1	.4	.3	.4	90	88	103	101	87	82
HH07ML1 7	.7	.6	.5	96	100	94	94	86	109
HH14ML1 14	.3	1.1	1.1	99	101	98	85	96	104
HH28ML1 28	*	3.0	3.0	96	97	99	92	111	119
HH99ML1 28	.9	.9	1.0	*	*	*	*	*	*
HH56ML1 57	.2	.7	1.2	96	99	103	91	93	94
HH99ML2 120	1.6	1.2	1.3	*	*	*	*	*	*
HH99ML3 240	1.2	3.3	3.3	*	*	*	*	*	*
HH99ML4 358	1.0	1.2	1.6	*	*	*	*	*	*
HH99ML5 493	1.6	.6	.6	*	*	*	*	*	*
HH99ML6 626	.4	1.8	1.4	*	*	*	*	*	*
HH99ML7 759	.2	3.6	3.2	117	*	121	*	*	*
METHYL ETHYL KETONE 3.0% 23°C									
HL01ML1 1	.1	.6	.5	98	100	94	87	103	117
HL07ML1 7	.4	*	*	97	100	87	84	87	85
HL14ML1 14	.5	*	.1	93	98	96	93	93	108
HL28ML1 28	.2	1.0	1.2	99	100	97	88	124	118
HL99ML1 28	.3	.7	.8	*	*	*	*	*	*
HL56ML1 57	.3	1.2	1.2	97	100	98	89	97	104
HL99ML2 120	.8	.3	.1	*	*	*	*	*	*
HL99ML3 235	.3	1.6	1.9	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
METHYL ETHYL KETONE 3.0% 23^oC									
HL99ML4 358	1.0	*	.1	*	*	*	*	*	*
HL99ML5 494	1.1	1.0	1.2	*	*	*	*	*	*
HL99ML6 627	.7	.3	.3	*	*	*	*	*	*
HL99ML7 757	.3	1.3	1.3	101	*	108	*	*	*
METHYL ETHYL KETONE 13.0% 50^oC									
HH01MM1 1	1.6	.3	1.9	97	96	97	91	101	108
HH07MM1 7	1.6	.9	2.0	97	102	104	93	99	111
HH14MM1 14	.4	1.5	.8	93	96	97	87	83	104
HH99MM1 28	11.2	10.3	10.6	*	*	*	*	*	*
HH28MM1 28	.8	.3	.5	94	98	104	89	90	80
HH56MM1 57	1.0	*	.4	91	94	108	104	82	76
HH99MM2 120	2.6	*	1.0	*	*	*	*	*	*
HH99MM3 239	1.6	1.7	2.7	*	*	*	*	*	*
HH99MM4 357	1.6	.3	.5	*	*	*	*	*	*
HH99MM5 493	1.2	.3	.7	*	*	*	*	*	*
HH99MM6 625	.7	4.7	4.4	*	*	*	*	*	*
HH99MM7 758	.6	3.0	3.3	104	*	128	*	*	*
METHYL ETHYL KETONE 13.0% 23^oC									
HL01MM1 1	.7	*	*	89	92	96	94	100	95
HL07MM1 7	1.2	4.2	4.8	96	100	96	84	93	93
HL14MM1 14	1.2	.3	.7	97	101	103	91	102	113
HL28MM1 28	1.0	1.0	1.5	93	98	97	88	111	128
HL99MM1 28	1.2	2.0	.9	*	*	*	*	*	*
HL56MM1 57	.4	1.0	1.2	98	100	99	90	91	91
HL99MM2 120	1.8	.7	.5	*	*	*	*	*	*
HL99MM3 234	.8	2.0	3.4	*	*	*	*	*	*
HL99MM4 357	1.0	.7	.1	*	*	*	*	*	*
HL99MM5 493	1.2	1.0	.3	*	*	*	*	*	*
HL99MM6 626	1.2	.3	68.0	*	*	*	*	*	*
HL99MM7 756	.9	.3	1.1	100	*	110	*	*	*
ASTM #2 OIL SATURATED 50^oC									
HH010M1 1	.1	.6	.3	100	101	96	93	112	98
HH070M1 7	.2	.3	.8	94	95	103	106	90	92
HH140M1 13	1.1	2.9	3.3	99	99	105	99	100	86
HH280M1 28	1.0	1.9	1.7	*	*	*	*	*	*
HH990M1 28	3.6	1.3	3.4	*	*	*	*	*	*
HH560M1 56	.3	2.0	1.4	101	102	99	93	100	99
HH990M2 128	4.7	100.0	100.0	*	*	*	*	*	*
HH990M3 251	5.6	.7	3.7	*	*	*	*	*	*
HH990M4 364	5.2	.3	3.1	*	*	*	*	*	*
HH990M5 503	5.9	.7	4.1	*	*	*	*	*	*
HH990M6 626	5.3	3.6	8.2	*	*	*	*	*	*
HH990M7 765	6.1	1.3	4.8	98	*	190	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
ASTM #2 OIL SATURATED 23°C									
HL01OM1 1	.1	.6	.4	96	99	99	95	96	102
HL07OM1 7	.2	.3	.1	95	97	99	96	106	112
HL14OM1 13	.2	2.4	2.4	95	97	104	99	92	94
HL99OM1 28	.8	2.6	3.4	*	*	*	*	*	*
HL28OM1 28	.3	1.5	.9	*	*	*	*	*	*
HL56OM1 56	.2	*	.2	103	108	101	92	96	111
HL99OM2 128	1.3	2.0	3.4	*	*	*	*	*	*
HL99OM3 237	1.0	3.3	5.1	*	*	*	*	*	*
HL99OM4 364	1.6	2.3	3.8	*	*	*	*	*	*
HL99OM5 503	2.4	1.6	2.6	*	*	*	*	*	*
HL99OM6 626	2.1	3.6	6.3	*	*	*	*	*	*
HL99OM7 763	3.0	11.1	13.1	100	*	157	*	*	*
ASTM #2 OIL 100.0% 50°C									
HH01OP1 1	.8	1.2	.6	90	89	106	103	85	81
HH07OP1 7	2.8	1.0	3.1	85	*	125	*	72	*
HH14OP1 14	4.1	.3	2.1	84	84	122	122	71	78
HH28OP1 28	4.8	.3	3.0	87	88	136	131	56	66
HH99OP1 28	5.4	1.6	5.9	*	*	*	*	*	*
HH56OP1 56	5.5	*	3.6	84	83	137	138	55	58
HH99OP2 141	5.9	1.6	6.2	*	*	*	*	*	*
HH99OP3 257	7.0	1.9	6.6	*	*	*	*	*	*
HH99OP4 385	5.9	1.9	7.4	*	*	*	*	*	*
HH99OP5 509	6.7	3.1	7.3	*	*	*	*	*	*
HH99OP6 627	6.5	4.7	13.5	*	*	*	*	*	*
HH99OP7 771	6.1	2.5	7.0	103	*	194	*	*	*
ASTM #2 OIL 100.0% 23°C									
HL01OP1 1	.2	1.0	.9	90	89	99	97	95	88
HL07OP1 7	.4	1.0	.8	92	94	101	93	104	107
HL14OP1 14	.7	.3	.5	93	92	105	96	124	111
HL99OP1 28	.5	.9	1.2	*	*	*	*	*	*
HL28OP1 28	.5	*	.4	92	94	105	97	87	97
HL56OP1 56	1.1	.3	.4	92	96	103	97	82	90
HL99OP2 141	1.9	.3	1.7	*	*	*	*	*	*
HL99OP3 244	2.1	5.6	7.8	*	*	*	*	*	*
HL99OP4 385	2.8	.6	2.4	*	*	*	*	*	*
HL99OP5 509	3.9	1.9	3.6	*	*	*	*	*	*
HL99OP6 627	3.9	3.1	6.3	*	*	*	*	*	*
HL99OP7 769	4.2	6.5	9.4	103	*	159	*	*	*
PHENOL 8.0% 50°C									
HH01PH1 1	.4	.3	.2	87	91	119	101	90	93
HH07PH1 7	1.0	.3	.2	87	89	118	93	86	85
HH14PH1 14	.1	.3	.3	87	88	119	112	89	89
HH28PH1 28	.9	.7	.4	92	93	112	97	92	92

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
			PHENOL 8.0% 50°C						
HH99PH1 29	1.3	*	.6	*	*	*	*	*	*
HH56PH1 56	.4	.6	.8	89	89	120	106	92	90
HH99PH2 121	2.0	.6	.2	*	*	*	*	*	*
HH99PH3 243	1.2	*	.9	*	*	*	*	*	*
HH99PH4 362	1.3	*	.6	*	*	*	*	*	*
HH99PH5 499	1.1	*	.5	*	*	*	*	*	*
HH99PH6 624	.8	1.6	1.9	*	*	*	*	*	*
HH99PH7 757	1.0	2.6	2.8	109	*	111	*	*	*
			PHENOL 8.0% 23°C						
HL01PH1 1	1.3	.3	100.0	93	90	111	95	93	92
HL07PH1 7	.1	*	.2	87	94	113	104	85	86
HL14PH1 14	3.7	.7	.3	90	92	112	111	87	93
HL28PH1 28	.7	2.3	2.0	91	92	99	90	95	92
HL99PH1 29	.8	.6	.7	*	*	*	*	*	*
HL56PH1 56	.4	.3	.3	88	89	116	105	92	92
HL99PH2 121	.9	.3	.8	*	*	*	*	*	*
HL99PH3 230	.8	3.2	4.2	*	*	*	*	*	*
HL99PH4 362	.4	1.0	1.3	*	*	*	*	*	*
HL99PH5 499	.8	*	.5	*	*	*	*	*	*
HL99PH6 625	.8	2.2	1.8	*	*	*	*	*	*
HL99PH7 755	1.2	8.0	8.4	109	*	111	*	*	*
			PHENOL 1.0% 50°C						
HH99PL4 1	100.0	100.0	100.0	*	*	*	*	*	*
HH01PL1 1	.3	*	.1	90	96	118	119	86	87
HH07PL1 7	1.2	.3	.4	89	92	113	97	91	92
HH14PL1 14	1.9	.6	.7	90	91	114	102	93	98
HH28PL1 28	.2	1.4	1.7	91	93	106	99	97	87
HH99PL1 28	.7	.7	.4	*	*	*	*	*	*
HH56PL1 56	.1	*	.1	93	94	120	96	99	104
HH99PL2 122	1.1	.3	.1	*	*	*	*	*	*
HH99PL3 245	1.6	*	.5	*	*	*	*	*	*
HH99PL5 499	.8	.3	*	*	*	*	*	*	*
HH99PL6 625	1.1	4.6	5.8	*	*	*	*	*	*
HH99PL7 758	1.0	6.9	6.9	103	*	116	*	*	*
			PHENOL 1.0% 23°C						
HL01PL1 1	.4	*	.2	93	95	106	96	104	106
HL07PL1 7	.1	5.9	6.1	94	94	100	98	99	98
HL14PL1 14	.2	.3	.6	89	90	117	104	89	91
HL28PL1 28	.2	.6	.7	92	96	101	97	99	93
HL99PL1 28	.3	2.3	1.9	*	*	*	*	*	*
HL56PL1 56	.1	*	*	90	93	92	104	94	102
HL99PL2 122	.4	1.3	.8	*	*	*	*	*	*
HL99PL3 233	.4	*	1.1	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
PHENOL 1.0% 23°C										
HL99PL4	363	1.1	1.3	.7	*	*	*	*	*	*
HL99PL5	499	.5	1.9	1.3	*	*	*	*	*	*
HL99PL6	626	.5	1.9	3.0	*	*	*	*	*	*
HL99PL7	756	.7	1.9	2.6	100	*	101	*	*	*
PHENOL 4.0% 50°C										
HH01PM1	1	.3	.3	.4	95	79	104	113	96	85
HH07PM1	7	.4	.3	.4	94	95	115	102	94	90
HH14PM1	14	2.2	.3	.3	92	88	109	102	95	95
HH28PM1	28	.7	.3	.4	92	92	110	94	89	91
HH99PM1	29	1.3	1.5	.8	*	*	*	*	*	*
HH56PM1	56	.3	.3	.5	91	93	116	115	86	94
HH99PM2	121	2.3	1.2	.5	*	*	*	*	*	*
HH99PM3	244	.4	.9	.1	*	*	*	*	*	*
HH99PM4	362	1.6	.6	.1	*	*	*	*	*	*
HH99PM5	499	2.4	1.5	2.4	*	*	*	*	*	*
HH99PM6	624	1.9	3.4	4.8	*	*	*	*	*	*
HH99PM7	757	2.3	7.3	8.1	112	*	128	*	*	*
PHENOL 4.0% 23°C										
HL01PM1	1	1.1	.3	.1	89	90	106	94	95	97
HL07PM1	7	.4	*	.1	90	89	109	93	88	89
HL14PM1	14	.5	.3	.6	90	94	113	102	90	98
HL28PM1	28	2.4	*	.2	92	93	108	98	92	92
HL99PM1	29	.7	.3	.1	*	*	*	*	*	*
HL56PM1	56	.3	.3	.9	89	92	112	98	97	93
HL99PM2	121	1.4	.3	.6	*	*	*	*	*	*
HL99PM3	231	.6	2.2	3.4	*	*	*	*	*	*
HL99PM4	362	.9	1.0	1.3	*	*	*	*	*	*
HL99PM5	499	1.1	.3	.1	*	*	*	*	*	*
HL99PM6	625	.8	2.9	3.8	*	*	*	*	*	*
HL99PM7	755	1.2	2.9	3.4	107	*	105	*	*	*
SODIUM CHLORIDE 35.0% 50°C										
HH01SH1	1	*	1.2	1.2	*	*	*	*	*	*
HH07SH1	7	*	.6	.7	*	*	*	*	*	*
HH14SH1	14	*	.6	.4	95	105	103	87	91	84
HH99SH1	28	.7	2.8	3.1	*	*	*	*	*	*
HH28SH1	28	*	1.9	2.2	113	*	94	*	94	*
HH56SH1	56	.1	2.0	1.8	101	104	107	97	81	90
HH99SH2	131	.2	.9	1.0	*	*	*	*	*	*
HH99SH3	253	1.5	1.6	1.8	*	*	*	*	*	*
HH99SH4	379	.1	3.7	4.4	*	*	*	*	*	*
HH99SH5	510	.9	1.9	1.7	*	*	*	*	*	*
HH99SH6	630	.1	9.3	10.3	*	*	*	*	*	*
HH99SH7	771	.1	3.1	3.1	111	*	116	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
			SODIUM CHLORIDE 35.0% 23°C						
HL01SH1 1	.1	1.3	1.4	*	*	*	*	*	*
HL07SH1 7	*	1.2	1.2	*	*	*	*	*	*
HL14SH1 14	*	.3	.2	95	98	96	83	77	109
HL28SH1 28	.1	1.0	.8	*	*	*	*	*	*
HL99SH1 28	1.1	4.5	4.7	*	*	*	*	*	*
HL56SH1 56	.1	.3	.3	94	99	104	96	84	89
HL99SH2 131	1.1	*	.4	*	*	*	*	*	*
HL99SH3 246	.2	1.8	2.7	*	*	*	*	*	*
HL99SH4 379	1.5	.3	.4	*	*	*	*	*	*
HL99SH5 510	.5	.3	.2	*	*	*	*	*	*
HL99SH6 630	.1	2.1	2.9	*	*	*	*	*	*
HL99SH7 769	.6	8.1	8.3	112	*	95	*	*	*
			SODIUM CHLORIDE 10.0% 50°C						
HH01SM2 1	.2	2.2	2.3	103	105	104	94	105	106
HH01SM1 1	.3	.8	.5	*	*	*	*	*	*
HH07SM1 7	.4	1.2	1.0	*	*	*	97	*	*
HH07SM2 7	.6	.3	.4	97	107	106	101	99	93
HH14SM1 14	*	1.2	.9	*	*	*	*	*	*
HH14SM2 15	.4	.9	1.0	104	109	103	88	104	100
HH28SM2 28	.4	1.2	1.9	101	109	100	89	101	96
HH99SM1 28	1.7	2.2	2.5	*	*	*	*	*	*
HH28SM1 28	6.7	.3	.1	*	*	*	*	*	*
HH56SM2 56	.6	2.0	2.1	97	114	99	89	94	99
HH56SM1 61	*	2.3	2.3	*	*	*	*	*	*
HH99SM2 132	1.3	.3	.7	*	*	*	*	*	*
HH99SM3 254	.8	*	.2	*	*	*	*	*	*
HH99SM4 370	.3	1.3	2.3	*	*	*	*	*	*
HH99SM5 511	.3	2.5	1.8	*	*	*	*	*	*
HH99SM6 624	*	6.3	7.2	*	*	*	*	*	*
HH99SM7 772	.7	2.2	2.3	116	*	110	*	*	*
			SODIUM CHLORIDE 10.0% 23°C						
HL01SM1 1	.4	1.2	1.1	*	*	*	*	*	*
HL01SM2 1	.2	1.1	1.0	108	108	108	97	96	101
HL07SM1 7	.1	.6	.6	*	*	*	*	*	*
HL07SM2 7	.1	*	*	92	101	105	93	106	109
HL14SM1 14	.1	*	.1	*	*	*	*	*	*
HL14SM2 15	.4	1.4	1.3	114	110	92	94	108	94
HL28SM2 28	.4	.9	1.2	120	106	96	86	103	115
HL99SM1 28	.1	5.8	5.9	*	*	*	*	*	*
HL28SM1 28	7.0	.3	.2	*	*	*	*	*	*
HL56SM2 56	.3	2.0	2.1	113	110	92	86	89	107
HL56SM1 61	*	1.8	1.7	*	*	*	*	*	*
HL99SM2 132	.2	7.5	7.2	*	*	*	*	*	*
HL99SM3 246	.1	6.7	5.6	*	*	*	*	*	*
HL99SM4 370	.5	7.2	7.1	*	*	*	*	*	*
HL99SM5 511	.7	8.1	8.3	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
SODIUM CHLORIDE 10.0% 23°C									
HL99SM6 624	*	4.6	4.1	*	*	*	*	*	*
HL99SM7 770	1.1	7.0	6.8	107	*	103	*	*	*
WATER 100.0% 50°C									
HH01WP2 1	*	100.0	100.0	108	99	101	96	94	105
HH01WP1 1	.1	.9	.7	*	*	*	*	*	*
HH07WP1 7	.1	1.8	2.3	*	*	*	*	*	*
HH07WP2 7	.1	.9	.8	107	106	105	87	98	90
HH14WP1 14	*	1.2	.8	104	108	*	*	*	*
HH14WP2 14	.1	.3	.1	112	113	96	89	113	104
HH99WP1 28	1.8	4.1	2.9	*	*	*	*	*	*
HH28WP2 28	.1	1.7	2.1	*	*	*	*	*	*
HH28WP1 28	.5	.9	.7	*	*	*	*	*	*
HH56WP2 56	.2	2.7	2.7	112	109	98	84	103	105
HH56WP1 56	.1	1.8	1.8	*	*	*	*	*	*
HH99WP2 133	2.0	5.2	3.9	*	*	*	*	*	*
HH99WP3 254	1.1	5.2	4.3	*	*	*	*	*	*
HH99WP4 370	.2	1.7	.8	*	*	*	*	*	*
HH99WP5 503	.3	4.6	3.9	*	*	*	*	*	*
HH99WP6 622	.1	1.7	.2	*	*	*	*	*	*
HH99WP7 772	.3	7.8	6.8	117	*	113	*	*	*
WATER 100.0% 23°C									
HL01WP2 1	100.0	100.0	100.0	101	98	99	87	110	114
HL01WP1 1	.1	.6	.5	*	*	*	*	*	*
HL07WP1 7	.1	1.2	1.2	*	*	*	*	*	*
HL07WP2 7	.1	.3	.3	111	111	99	90	87	108
HL14WP2 14	.1	3.0	2.7	114	109	96	86	94	106
HL14WP1 14	*	.9	.8	94	107	*	*	*	*
HL28WP2 28	*	.6	.8	*	*	*	*	*	*
HL99WP1 28	.5	12.3	11.4	*	*	*	*	*	*
HL28WP1 28	.3	*	.1	*	*	*	*	*	*
HL56WP1 56	.2	.3	*	*	*	*	*	*	*
HL56WP2 56	*	3.5	3.7	100	101	85	82	103	100
HL99WP2 132	.5	12.0	10.7	*	*	*	*	*	*
HL99WP3 246	.1	11.2	6.8	*	*	*	*	*	*
HL99WP4 370	.4	9.8	9.1	*	*	*	*	*	*
HL99WP5 503	.2	12.0	11.3	*	*	*	*	*	*
HL99WP6 622	.2	11.7	10.4	*	*	*	*	*	*
HL99WP7 770	.5	*	.6	108	*	101	*	*	*
POTASSIUM DICHROMATE 10.0% 50°C									
HH01XM1 1	*	.8	.8	110	103	106	98	106	100
HH07XM1 7	.1	*	*	108	104	97	89	88	82
HH14XM1 14	*	2.6	3.0	99	101	103	88	88	110
HH28XM1 28	.1	3.9	3.8	110	104	106	91	93	94
HH99XM1 28	1.4	.3	.8	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

IMMERSION DAYS	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT VOLUME CHANGE	PERCENT YIELD M	PERCENT YIELD M	PERCENT ELYLD M	PERCENT ELYLD T	PERCENT MODE M	PERCENT MODE T
POTASSIUM DICHROMATE 10.0% 50°C									
HH56XM1 55	*	1.2	1.2	113	108	105	101	96	87
HH99XM2 118	1.5	1.3	.9	*	*	*	*	*	*
HH99XM3 231	2.2	4.0	3.8	*	*	*	*	*	*
HH99XM4 363	1.3	1.3	.7	*	*	*	*	*	*
HH99XM5 489	1.3	.7	.2	*	*	*	*	*	*
HH99XM6 609	1.3	6.6	6.8	*	*	*	*	*	*
HH99XM7 749	1.5	*	.5	107	*	115	*	*	*
POTASSIUM DICHROMATE 10.0% 23°C									
HL01XM1 1	*	.6	.8	99	100	103	83	91	94
HL07XM1 7	*	.3	.4	96	97	99	86	74	80
HL14XM1 14	*	1.0	1.3	116	101	96	85	120	105
HL28XM1 28	*	1.5	1.5	106	107	92	89	83	90
HL99XM1 28	.7	.7	.1	*	*	*	*	*	*
HL56XM1 55	*	1.4	1.5	96	97	98	96	86	73
HL99XM2 118	.8	1.3	.9	*	*	*	*	*	*
HL99XM3 223	.2	4.6	4.9	*	*	*	*	*	*
HL99XM4 363	.1	2.0	1.4	*	*	*	*	*	*
HL99XM5 489	1.3	.3	.3	*	*	*	*	*	*
HL99XM6 640	.1	5.3	5.5	*	*	*	*	*	*
HL99XM7 747	.5	11.3	10.6	103	*	93	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			HYDROCHLORIC ACID 10.0% 50°C			
HH01AM1 1	105	108	106	95	103	122
HH01AM2 1	*	*	*	*	*	*
HH07AM2 7	*	*	*	*	*	*
HH07AM1 7	104	101	102	94	116	116
HH14AM1 14	87	80	99	86	92	84
HH14AM2 14	*	*	*	*	*	*
HH99AM1 28	*	*	*	*	*	*
HH28AM1 29	85	93	95	88	93	101
HH28AM2 29	*	*	*	*	*	*
HH56AM1 56	100	93	104	91	116	110
HH56AM2 56	*	*	*	*	*	*
HH99AM2 144	*	*	*	*	*	*
HH99AM3 252	*	*	*	*	*	*
HH99AM4 368	*	*	*	*	*	*
HH99AM5 511	*	*	*	*	*	*
HH99AM6 621	*	*	*	*	*	*
HH99AM7 770	86	*	91	*	*	*
			HYDROCHLORIC ACID 10.0% 23°C			
HL01AM2 1	*	*	*	*	*	*
HL01AM1 1	96	94	99	92	113	92
HL07AM2 7	*	*	*	*	*	*
HL07AM1 7	90	91	104	91	103	105
HL14AM2 14	*	*	*	*	*	*
HL14AM1 14	115	111	103	95	130	128
HL99AM1 28	*	*	*	*	*	*
HL28AM1 29	91	88	103	88	102	106
HL28AM2 29	*	*	*	*	*	*
HL56AM2 56	*	*	*	*	*	*
HL56AM1 56	106	105	108	99	122	117
HL99AM2 144	*	*	*	*	*	*
HL99AM3 238	*	*	*	*	*	*
HL99AM4 368	*	*	*	*	*	*
HL99AM5 511	*	*	*	*	*	*
HL99AM6 621	*	*	*	*	*	*
HL99AM7 768	104	*	104	*	*	*
			SODIUM HYDROXIDE 10.0% 50°C			
HH01BM1 1	105	115	95	97	96	110
HH07BM1 7	93	101	95	96	109	101
HH14BM1 13	94	87	98	88	103	97
HH28BM1 28	105	102	98	92	91	98
HH99BM1 29	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
SODIUM HYDROXIDE 10.0% 50°C							
HH56BM1	56	100	99	107	93	111	110
HH99BM2	144	*	*	*	*	*	*
HH99BM3	252	*	*	*	*	*	*
HH99BM4	368	*	*	*	*	*	*
HH99BM5	510	*	*	*	*	*	*
HH99BM6	622	*	*	*	*	*	*
HH99BM7	770	106	*	106	*	*	*
SODIUM HYDROXIDE 10.0% 23°C							
HL01BM1	1	88	104	93	97	96	100
HL07BM1	7	90	101	92	95	115	115
HL14BM1	14	87	96	94	87	105	100
HL28BM1	28	94	95	99	94	102	97
HL99BM1	28	*	*	*	*	*	*
HL56BM1	56	104	83	105	87	104	107
HL99BM2	144	*	*	*	*	*	*
HL99BM3	238	*	*	*	*	*	*
HL99BM4	368	*	*	*	*	*	*
HL99BM5	510	*	*	*	*	*	*
HL99BM6	622	*	*	*	*	*	*
HL99BM7	768	101	*	101	*	*	*
1 2 DICHLOROETHANE .8% 50°C							
HH01DH1	1	92	89	97	91	98	92
HH07DH1	7	82	86	88	86	88	88
HH14DH1	14	82	88	88	87	92	90
HH28DH1	28	83	87	89	87	99	98
HH99DH1	28	*	*	*	*	*	*
HH56DH1	56	*	*	*	*	93	93
HH99DH2	133	*	*	*	*	*	*
HH99DH3	244	*	*	*	*	*	*
HH99DH4	364	*	*	*	*	*	*
HH99DH5	495	*	*	*	*	*	*
HH99DH6	629	*	*	*	*	*	*
HH99DH7	763	85	*	91	*	*	*
1 2 DICHLOROETHANE .8% 23°C							
HL01DH1	1	89	91	97	90	97	94
HL07DH1	7	87	83	93	83	91	88
HL14DH1	14	89	84	94	84	95	94
HL99DH1	28	*	*	*	*	*	*
HL28DH1	28	89	88	93	86	97	98
HL56DH1	56	*	*	*	*	91	93

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

1 2 DICHLOROETHANE .8% 23°C

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
HL99DH2 134	*	*	*	*	*	*
HL99DH3 231	*	*	*	*	*	*
HL99DH4 364	*	*	*	*	*	*
HL99DH5 495	*	*	*	*	*	*
HL99DH6 630	*	*	*	*	*	*
HL99DH7 761	105	*	104	*	*	*

1 2 DICHLOROETHANE .1% 50°C

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
HH01DL1 1	90	90	99	92	95	93
HH07DL1 7	84	87	91	85	93	91
HH14DL1 14	87	89	93	87	94	92
HH99DL1 28	*	*	*	*	*	*
HH28DL1 28	87	89	93	86	104	103
HH56DL1 56	*	*	*	*	94	94
HH99DL2 139	*	*	*	*	*	*
HH99DL3 246	*	*	*	*	*	*
HH99DL4 370	*	*	*	*	*	*
HH99DL5 496	*	*	*	*	*	*
HH99DL6 631	*	*	*	*	*	*
HH99DL7 765	104	*	109	*	*	*

1 2 DICHLOROETHANE .1% 23°C

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
HL01DL1 1	91	91	97	92	95	95
HL07DL1 7	88	86	94	84	90	87
HL14DL1 14	90	87	95	85	94	93
HL99DL1 28	*	*	*	*	*	*
HL28DL1 28	90	87	96	85	104	104
HL56DL1 56	*	*	*	*	94	95
HL99DL2 136	*	*	*	*	*	*
HL99DL3 233	*	*	*	*	*	*
HL99DL4 366	*	*	*	*	*	*
HL99DL5 496	*	*	*	*	*	*
HL99DL6 632	*	*	*	*	*	*
HL99DL7 763	110	*	108	*	*	*

1 2 DICHLOROETHANE .5% 50°C

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
HH01DM1 1	88	90	98	91	97	94
HH07DM1 7	81	86	89	88	90	85
HH14DM1 14	87	86	93	86	93	89
HH28DM1 28	89	86	95	86	99	102
HH99DM1 28	*	*	*	*	*	*
HH56DM1 56	*	*	*	*	98	92
HH99DM3 245	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
1 2 DICHLOROETHANE .5% 50°C							
HH99DM4	365	*	*	*	*	*	*
HH99DM5	496	*	*	*	*	*	*
HH99DM6	630	*	*	*	*	*	*
HH99DM7	764	89	*	96	*	*	*
1 2 DICHLOROETHANE .5% 23°C							
HL01DM1	1	96	91	102	90	97	94
HL07DM1	7	87	92	94	85	90	95
HL14DM1	14	91	87	96	85	99	97
HL28DM1	28	85	87	93	87	98	104
HL99DM1	28	*	*	*	*	*	*
HL56DM1	56	*	*	*	*	96	95
HL99DM2	135	*	*	*	*	*	*
HL99DM3	233	*	*	*	*	*	*
HL99DM4	365	*	*	*	*	*	*
HL99DM5	496	*	*	*	*	*	*
HL99DM6	631	*	*	*	*	*	*
HL99DM7	762	100	*	101	*	*	*
FURFURAL 8.0% 50°C							
HH01FH1	1	75	77	81	77	104	123
HH07FH1	7	83	83	91	82	94	95
HH14FH1	14	85	87	89	82	100	98
HH28FH1	28	92	95	89	84	100	99
HH99FH1	28	*	*	*	*	*	*
HH56FH1	56	85	89	77	78	98	95
HH99FH2	117	*	*	*	*	*	*
HH99FH3	236	*	*	*	*	*	*
HH99FH4	350	*	*	*	*	*	*
HH99FH5	485	*	*	*	*	*	*
HH99FH6	616	*	*	*	*	*	*
HH99FH7	750	90	*	93	*	*	*
FURFURAL 8.0% 23°C							
HL01FH1	1	80	75	85	75	107	117
HL07FH1	7	82	82	85	81	101	100
HL14FH1	14	87	87	91	82	97	96
HL99FH1	28	*	*	*	*	*	*
HL28FH1	28	97	87	98	79	93	95
HL56FH1	56	86	84	81	82	98	96
HL99FH2	117	*	*	*	*	*	*
HL99FH3	219	*	*	*	*	*	*
HL99FH4	350	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
			FURFURAL 8.0% 23°C				
HL99FH5	485	*	*	*	*	*	*
HL99FH6	617	*	*	*	*	*	*
HL99FH7	748	75	*	76	*	*	*
			FURFURAL 1.0% 50°C				
HH01FL1	1	93	74	80	74	106	125
HH07FL1	7	82	81	87	83	97	93
HH14FL1	14	81	78	89	81	109	104
HH28FL1	28	80	88	76	77	105	100
HH99FL1	29	*	*	*	*	*	*
HH56FL1	56	92	92	83	80	101	94
HH99FL2	124	*	*	*	*	*	*
HH99FL3	242	*	*	*	*	*	*
HH99FL4	356	*	*	*	*	*	*
HH99FL5	489	*	*	*	*	*	*
HH99FL6	622	*	*	*	*	*	*
HH99FL7	756	89	*	91	*	*	*
			FURFURAL 1.0% 23°C				
HL01FL1	1	72	73	75	73	124	123
HL07FL1	7	82	84	86	81	97	98
HL14FL1	14	77	79	85	81	104	109
HL28FL1	28	*	*	*	*	100	94
HL28FL2	28	89	89	91	84	101	100
HL99FL1	29	*	*	*	*	*	*
HL56FL1	56	89	86	92	77	102	106
HL99FL2	124	*	*	*	*	*	*
HL99FL3	225	*	*	*	*	*	*
HL99FL4	356	*	*	*	*	*	*
HL99FL5	489	*	*	*	*	*	*
HL99FL6	623	*	*	*	*	*	*
HL99FL7	754	102	*	99	*	*	*
			FURFURAL 4.0% 50°C				
HH01FM1	1	77	75	80	74	125	119
HH07FM1	7	82	84	86	80	97	94
HH14FM1	14	81	85	89	84	97	92
HH28FM1	28	86	88	108	99	95	92
HH99FM1	29	*	*	*	*	*	*
HH56FM1	56	84	89	88	88	98	96
HH99FM2	124	*	*	*	*	*	*
HH99FM3	242	*	*	*	*	*	*
HH99FM4	356	*	*	*	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
		FURFURAL 4.0% $50^{o}C$				
HH99FM5 490	*	*	*	*	*	*
HH99FM6 622	*	*	*	*	*	*
HH99FM7 756	77	*	83	*	*	*
		FURFURAL 4.0% $23^{o}C$				
HL01FM1 1	74	78	79	76	123	123
HL07FM1 7	82	84	97	83	97	97
HL14FM1 14	88	89	94	78	100	97
HL28FM1 28	82	88	103	94	93	89
HL99FM1 29	*	*	*	*	*	*
HL56FM1 56	87	91	102	94	95	96
HL99FM2 124	*	*	*	*	*	*
HL99FM3 228	*	*	*	*	*	*
HL99FM4 356	*	*	*	*	*	*
HL99FM5 490	*	*	*	*	*	*
HL99FM6 623	*	*	*	*	*	*
HL99FM7 754	77	*	78	*	*	*
		METHYL ETHYL KETONE 26.0% $50^{o}C$				
HH01MH1 1	93	95	98	92	101	100
HH07MH1 7	102	94	105	91	99	100
HH14MH1 14	87	99	89	94	96	95
HH28MH1 28	92	94	98	91	100	98
HH99MH1 29	*	*	*	*	*	*
HH56MH1 57	93	99	100	99	99	94
HH99MH2 122	*	*	*	*	*	*
HH99MH3 240	*	*	*	*	*	*
HH99MH4 358	*	*	*	*	*	*
HH99MH5 493	*	*	*	*	*	*
HH99MH6 626	*	*	*	*	*	*
HH99MH7 759	75	*	72	*	*	*
		METHYL ETHYL KETONE 26.0% $23^{o}C$				
HL01MH1 1	92	96	96	92	99	100
HL07MH1 7	99	92	102	88	98	97
HL14MH1 14	94	94	97	90	109	102
HL28MH1 28	99	94	102	91	100	101
HL99MH1 29	*	*	*	*	*	*
HL56MH1 57	120	92	90	88	99	96
HL99MH2 122	*	*	*	*	*	*
HL99MH3 235	*	*	*	*	*	*
HL99MH4 358	*	*	*	*	*	*
HL99MH5 493	*	*	*	*	*	*
HL99MH6 627	*	*	*	*	*	*
HL99MH7 757	82	*	89	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
METHYL ETHYL KETONE 3.0% 50°C						
HH01ML1 1	96	87	101	89	98	96
HH07ML1 7	97	89	101	87	99	98
HH14ML1 14	94	99	98	94	99	94
HH28ML1 28	98	96	101	92	99	99
HH99ML1 28	*	*	*	*	*	*
HH56ML1 57	89	95	95	93	98	96
HH99ML2 120	*	*	*	*	*	*
HH99ML3 240	*	*	*	*	*	*
HH99ML4 358	*	*	*	*	*	*
HH99ML5 493	*	*	*	*	*	*
HH99ML6 626	*	*	*	*	*	*
HH99ML7 759	90	*	89	*	*	*
METHYL ETHYL KETONE 3.0% 23°C						
HL01ML1 1	92	94	95	89	105	104
HL07ML1 7	97	102	98	97	100	98
HL14ML1 14	95	96	99	91	99	100
HL28ML1 28	98	101	99	94	109	109
HL99ML1 28	*	*	*	*	*	*
HL56ML1 57	99	97	103	92	102	97
HL99ML2 120	*	*	*	*	*	*
HL99ML3 235	*	*	*	*	*	*
HL99ML4 358	*	*	*	*	*	*
HL99ML5 494	*	*	*	*	*	*
HL99ML6 627	*	*	*	*	*	*
HL99ML7 757	112	*	107	*	*	*
METHYL ETHYL KETONE 13.0% 50°C						
HH01MM1 1	91	90	94	87	97	95
HH07MM1 7	100	88	104	85	102	99
HH14MM1 14	97	89	102	89	102	100
HH99MM1 28	*	*	*	*	*	*
HH28MM1 28	91	96	95	92	103	107
HH56MM1 57	92	96	100	94	100	98
HH99MM2 120	*	*	*	*	*	*
HH99MM3 239	*	*	*	*	*	*
HH99MM4 357	*	*	*	*	*	*
HH99MM5 493	*	*	*	*	*	*
HH99MM6 625	*	*	*	*	*	*
HH99MM7 758	79	*	88	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
METHYL ETHYL KETONE 13.0% 23°C							
HL01MM1	1	95	92	101	91	98	96
HL07MM1	7	91	91	95	88	102	96
HL14MM1	14	95	97	100	94	100	93
HL28MM1	28	89	87	93	85	102	105
HL99MM1	28	*	*	*	*	*	*
HL56MM1	57	96	102	99	96	99	94
HL99MM2	120	*	*	*	*	*	*
HL99MM3	234	*	*	*	*	*	*
HL99MM4	357	*	*	*	*	*	*
HL99MM5	493	*	*	*	*	*	*
HL99MM6	626	*	*	*	*	*	*
HL99MM7	756	82	*	87	*	*	*
ASTM #2 OIL SATURATED 50°C							
HH010M1	1	95	91	96	86	100	97
HH070M1	7	93	94	98	92	98	98
HH140M1	13	86	88	91	86	101	102
HH280M1	28	100	99	99	94	103	102
HH990M1	28	*	*	*	*	*	*
HH560M1	56	98	95	100	90	101	98
HH990M2	128	*	*	*	*	*	*
HH990M3	251	*	*	*	*	*	*
HH990M4	364	*	*	*	*	*	*
HH990M5	503	*	*	*	*	*	*
HH990M6	626	*	*	*	*	*	*
HH990M7	765	96	*	96	*	*	*
ASTM #2 OIL SATURATED 23°C							
HL010M1	1	96	92	100	89	99	98
HL070M1	7	94	92	101	91	102	97
HL140M1	13	90	74	97	73	101	95
HL990M1	28	*	*	*	*	*	*
HL280M1	28	99	103	105	103	100	99
HL560M1	56	102	100	106	94	106	91
HL990M2	128	*	*	*	*	*	*
HL990M3	237	*	*	*	*	*	*
HL990M4	364	*	*	*	*	*	*
HL990M5	503	*	*	*	*	*	*
HL990M6	626	*	*	*	*	*	*
HL990M7	763	100	*	103	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
ASTM #2 OIL 100.0% 50°C						
HH010P1 1	89	89	95	90	101	97
HH070P1 7	96	*	103	*	93	86
HH140P1 14	93	96	97	95	91	87
HH280P1 28	93	93	97	91	91	90
HH990P1 28	*	*	*	*	*	*
HH560P1 56	95	92	95	92	97	98
HH990P2 141	*	*	*	*	*	*
HH990P3 257	*	*	*	*	*	*
HH990P4 385	*	*	*	*	*	*
HH990P5 509	*	*	*	*	*	*
HH990P6 627	*	*	*	*	*	*
HH990P7 771	101	*	99	*	*	*
ASTM #2 OIL 100.0% 23°C						
HL010P1 1	87	95	92	93	100	101
HL070P1 7	99	104	104	99	100	100
HL140P1 14	93	90	98	88	94	91
HL990P1 28	*	*	*	*	*	*
HL280P1 28	97	101	103	95		96
HL560P1 56	96	89	100	87	99	99
HL990P2 141	*	*	*	*	*	*
HL990P3 244	*	*	*	*	*	*
HL990P4 385	*	*	*	*	*	*
HL990P5 509	*	*	*	*	*	*
HL990P6 627	*	*	*	*	*	*
HL990P7 769	93	*	97	*	*	*
PHENOL 8.0% 50°C						
HH01PH1 1	93	90	98	88	96	95
HH07PH1 7	90	80	96	81	98	93
HH14PH1 14	89	84	95	85	99	98
HH28PH1 28	91	90	94	88	100	97
HH99PH1 29	*	*	*	*	*	*
HH56PH1 56	94	85	98	85	93	92
HH99PH2 121	*	*	*	*	*	*
HH99PH3 243	*	*	*	*	*	*
HH99PH4 362	*	*	*	*	*	*
HH99PH5 499	*	*	*	*	*	*
HH99PH6 624	*	*	*	*	*	*
HH99PH7 757	104	*	100	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
PHENOL 8.0% 23°C						
HL01PH1 1	88	86	95	87	98	97
HL07PH1 7	93	86	98	86	100	99
HL14PH1 14	89	90	94	87	102	104
HL28PH1 28	91	90	97	89	99	93
HL99PH1 29	*	*	*	*	*	*
HL56PH1 56	91	89	96	88	94	96
HL99PH2 121	*	*	*	*	*	*
HL99PH3 230	*	*	*	*	*	*
HL99PH4 362	*	*	*	*	*	*
HL99PH5 499	*	*	*	*	*	*
HL99PH6 625	*	*	*	*	*	*
HL99PH7 755	95	*	98	*	*	*
PHENOL 1.0% 50°C						
HH99PL4 1	*	*	*	*	*	*
HH01PL1 1	88	90	94	87	100	96
HH07PL1 7	91	91	97	89	98	103
HH14PL1 14	91	91	95	89	101	100
HH28PL1 28	91	91	94	88	100	101
HH99PL1 28	*	*	*	*	*	*
HH56PL1 56	83	87	90	88	94	90
HH99PL2 122	*	*	*	*	*	*
HH99PL3 245	*	*	*	*	*	*
HH99PL5 499	*	*	*	*	*	*
HH99PL6 625	*	*	*	*	*	*
HH99PL7 758	87	*	85	*	*	*
PHENOL 1.0% 23°C						
HL01PL1 1	89	90	85	78	98	95
HL07PL1 7	83	90	90	87	101	102
HL14PL1 14	88	90	95	88	98	98
HL28PL1 28	90	89	96	85	101	102
HL99PL1 28	*	*	*	*	*	*
HL56PL1 56	92	90	96	87	100	95
HL99PL2 122	*	*	*	*	*	*
HL99PL3 233	*	*	*	*	*	*
HL99PL4 363	*	*	*	*	*	*
HL99PL5 499	*	*	*	*	*	*
HL99PL6 626	*	*	*	*	*	*
HL99PL7 756	87	*	91	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
		PHENOL 4.0% 50°C				
HH01PM1 1	96	83	88	92	98	93
HH07PM1 7	93	90	96	88	100	100
HH14PM1 14	89	90	93	86	100	
HH28PM1 28	91	86	95	85	98	94
HH99PM1 29	*	*	*	*	*	*
HH56PM1 56	92	91	98	88	95	95
HH99PM2 121	*	*	*	*	*	*
HH99PM3 244	*	*	*	*	*	*
HH99PM4 362	*	*	*	*	*	*
HH99PM5 499	*	*	*	*	*	*
HH99PM6 624	*	*	*	*	*	*
HH99PM7 757	73	*	76	*	*	*
		PHENOL 4.0% 23°C				
HL01PM1 1	90	83	96	84	94	95
HL07PM1 7	82	89	88	89	99	97
HL14PM1 14	87	91	94	88	103	100
HL28PM1 28	89	87	94	86	100	98
HL99PM1 29	*	*	*	*	*	*
HL56PM1 56	90	91	98	91	100	95
HL99PM2 121	*	*	*	*	*	*
HL99PM3 231	*	*	*	*	*	*
HL99PM4 362	*	*	*	*	*	*
HL99PM5 499	*	*	*	*	*	*
HL99PM6 625	*	*	*	*	*	*
HL99PM7 755	102	*	98	*	*	*
		SODIUM CHLORIDE 35.0% 50°C				
HH01SH1 1	97	95	91	101	95	95
HH07SH1 7	95	99	94	97	101	100
HH14SH1 14	92	100	101	95	104	100
HH99SH1 28	*	*	*	*	*	*
HH28SH1 28	97	100	98	92	101	89
HH56SH1 56	101	93	104	90	107	107
HH99SH2 131	*	*	*	*	*	*
HH99SH3 253	*	*	*	*	*	*
HH99SH4 379	*	*	*	*	*	*
HH99SH5 510	*	*	*	*	*	*
HH99SH6 630	*	*	*	*	*	*
HH99SH7 771	87	*	93	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
				SODIUM CHLORIDE 35.0% 23°C			
HL01SH1	1	96	99	101	96	99	101
HL07SH1	7	94	88	92	93	102	106
HL14SH1	14	97	98	101	95	100	111
HL28SH1	28	102	107	101	93	99	107
HL99SH1	28	*	*	*	*	*	*
HL56SH1	56	98	99	103	93	103	105
HL99SH2	131	*	*	*	*	*	*
HL99SH3	246	*	*	*	*	*	*
HL99SH4	379	*	*	*	*	*	*
HL99SH5	510	*	*	*	*	*	*
HL99SH6	630	*	*	*	*	*	*
HL99SH7	769	97	*	90	*	*	*
				SODIUM CHLORIDE 10.0% 50°C			
HH01SM2	1	*	*	*	*	*	*
HH01SM1	1	88	82	104	90	102	92
HH07SM1	7	90	84	103	89	98	103
HH07SM2	7	*	100	*	*	*	*
HH14SM1	14	98	85	101	85	106	97
HH14SM2	15	*	*	*	*	*	*
HH28SM2	28	*	*	*	*	*	*
HH99SM1	28	*	*	*	*	*	*
HH28SM1	28	101	106	98	98	114	104
HH56SM2	56	*	*	*	*	*	*
HH56SM1	61	98	99	99	94	109	111
HH99SM2	132	*	*	*	*	*	*
HH99SM3	254	*	*	*	*	*	*
HH99SM4	370	*	*	*	*	*	*
HH99SM5	511	*	*	*	*	*	*
HH99SM6	624	*	*	*	*	*	*
HH99SM7	772	111	*	105	*	*	*
				SODIUM CHLORIDE 10.0% 23°C			
HL01SM1	1	91	86	93	89	111	103
HL01SM2	1	*	*	*	*	*	*
HL07SM1	7	92	2	103	100	99	105
HL07SM2	7	*	*	*	*	*	*
HL14SM1	14	101	78	103	76	105	98
HL14SM2	15	*	*	*	*	*	*
HL28SM2	28	*	*	*	*	*	*
HL99SM1	28	*	*	*	*	*	*
HL28SM1	28	99	68	97	64	109	114
HL56SM2	56	*	*	*	*	*	*
HL56SM1	61	106	95	104	92	113	112

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
SODIUM CHLORIDE 10.0% 23°C						
HL99SM2 132	*	*	*	*	*	*
HL99SM3 246	*	*	*	*	*	*
HL99SM4 370	*	*	*	*	*	*
HL99SM5 511	*	*	*	*	*	*
HL99SM6 624	*	*	*	*	*	*
HL99SM7 770	111	*	105	*	*	*
WATER 100.0% 50°C						
HH01WP2 1	*	*	*	*	*	*
HH01WP1 1	100	100	98	103	116	102
HH07WP1 7	100	94	107	97	94	94
HH07WP2 7	*	*	*	*	*	*
HH14WP1 14	96	94	90	90	103	98
HH14WP2 14	*	*	*	*	*	*
HH99WP1 28	*	*	*	*	*	*
HH28WP2 28	90	89	108	95	93	89
HH28WP1 28	97	97	109	95	97	99
HH56WP2 56	*	*	*	*	*	*
HH56WP1 56	102	97	102	93	108	107
HH99WP2 133	*	*	*	*	*	*
HH99WP3 254	*	*	*	*	*	*
HH99WP4 370	*	*	*	*	*	*
HH99WP5 503	*	*	*	*	*	*
HH99WP6 622	*	*	*	*	*	*
HH99WP7 772	105	*	100	*	*	*
WATER 100.0% 23°C						
HL01WP2 1	*	*	*	*	*	*
HL01WP1 1	87	86	105	97	93	87
HL07WP1 7	95	105	99	98	108	111
HL07WP2 7	*	*	*	*	*	*
HL14WP2 14	*	*	*	*	*	*
HL14WP1 14	80	96	95	96	99	84
HL28WP2 28	99	92	109	96	109	87
HL99WP1 28	*	*	*	*	*	*
HL28WP1 28	93	97	103	92	92	93
HL56WP1 56	101	92	103	95	105	99
HL56WP2 56	*	*	*	*	*	*
HL99WP2 132	*	*	*	*	*	*
HL99WP3 246	*	*	*	*	*	*
HL99WP4 370	*	*	*	*	*	*
HL99WP5 503	*	*	*	*	*	*
HL99WP6 622	*	*	*	*	*	*
HL99WP7 770	113	*	105	*	*	*

HIGH DENSITY POLYETHYLENE: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT RETENTION TENSILE M	PERCENT RETENTION TENSILE T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR LB/IN M	PERCENT RETENTION TEAR LB/IN T
		POTASSIUM DICHROMATE 10.0% 50°C				
HH01XM1 1	90	94	90	94	94	92
HH07XM1 7	101	99	101	95	112	106
HH14XM1 14	97	86	101	84	105	96
HH28XM1 28	105	102	107	100	98	91
HH99XM1 28	*	*	*	*	*	*
HH56XM1 55	103	96	103	95	102	93
HH99XM2 118	*	*	*	*	*	*
HH99XM3 231	*	*	*	*	*	*
HH99XM4 363	*	*	*	*	*	*
HH99XM5 489	*	*	*	*	*	*
HH99XM6 609	*	*	*	*	*	*
HH99XM7 749	72	*	73	*	*	*
		POTASSIUM DICHROMATE 10.0% 23°C				
HL01XM1 1	101	104	102	99	96	93
HL07XM1 7	97	88	105	89	99	101
HL14XM1 14	113	85	105	84	96	94
HL28XM1 28	102	68	91	65	95	100
HL99XM1 28	*	*	*	*	*	*
HL56XM1 55	92	95	103	96	107	108
HL99XM2 118	*	*	*	*	*	*
HL99XM3 223	*	*	*	*	*	*
HL99XM4 363	*	*	*	*	*	*
HL99XM5 489	*	*	*	*	*	*
HL99XM6 640	*	*	*	*	*	*
HL99XM7 747	89	*	90	*	*	*

CSPE_LW :   FINAL PROPERTIES

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
HYDROCHLORIC ACID 10.0% 50°C												
QH01AM1 1	2.17	30.30	2.96	1.01	40.64	26.92	50.60	44.44	224.86	304.16	11.70	9.13
QH07AM1 7	2.30	32.00	2.92	1.01	39.62	26.44	53.18	47.74	239.62	318.60	11.71	9.31
QH14AM1 14	2.25	31.80	2.91	1.02	38.16	26.54	52.64	51.62	251.90	328.16	11.22	9.26
QH28AM1 28	2.43	34.50	2.92	1.02	37.82	24.40	57.02	51.88	239.18	329.44	10.49	8.60
QH99AM1 46	2.44	35.40	2.90	1.04	*	*	*	*	*	*	*	*
QH56AM1 56	2.54	36.00	2.93	1.03	30.94	19.02	55.96	53.88	246.06	349.96	8.47	7.35
QH99AM2 123	2.63	37.50	2.94	1.07	*	*	*	*	*	*	*	*
QH99AM3 242	2.63	38.10	2.94	1.07	16.95	*	49.85	*	539.67	*	*	*
HYDROCHLORIC ACID 10.0% 23°C												
QL01AM1 1	2.22	30.70	3.00	1.00	45.70	30.50	52.04	44.80	196.00	280.22	13.01	10.15
QL07AM1 7	2.26	32.00	3.01	1.00	43.70	27.38	49.84	41.26	204.08	299.10	12.60	9.85
QL14AM1 14	2.14	29.60	3.00	1.00	44.06	27.28	52.86	40.42	218.98	328.74	12.27	9.62
QL28AM1 28	2.17	30.20	3.01	1.00	44.18	28.82	50.94	45.80	208.42	310.78	12.86	10.12
QL99AM1 46	2.17	30.70	2.99	0.99	*	*	*	*	*	*	*	*
QL56AM1 56	2.10	29.10	3.00	1.00	40.96	26.22	50.82	44.64	215.84	311.02	11.98	9.82
QL99AM2 123	2.18	30.70	2.99	0.99	*	*	*	*	*	*	*	*
QL99AM3 241	2.21	31.30	3.00	0.99	32.53	*	44.06	*	457.75	*	*	*
SODIUM HYDROXIDE 10.0% 50°C												
QH01BM1 1	2.31	32.70	2.94	1.01	41.46	27.72	45.90	42.74	188.28	312.18	11.50	9.53
QH07BM1 7	2.34	33.70	2.90	1.01	37.74	25.02	44.40	39.58	207.40	301.60	11.28	9.11
QH14BM1 14	2.19	31.70	2.91	1.02	42.04	27.90	53.22	43.00	202.08	255.26	11.11	9.18
QH28BM1 28	2.38	33.70	2.95	1.03	41.98	28.92	54.46	42.24	186.46	213.34	9.76	8.43
QH99BM1 46	2.35	34.70	2.90	1.02	*	*	*	*	*	*	*	*
QH56BM1 56	2.52	35.70	2.95	1.04	47.04	32.24	63.48	49.96	183.44	208.88	10.08	8.20
QH99BM2 124	2.62	37.80	2.96	1.06	*	*	*	*	*	*	*	*
QH99BM3 242	2.68	38.20	2.98	1.08	32.95	*	65.07	*	310.00	*	*	*
SODIUM HYDROXIDE 10.0% 23°C												
QL01BM1 1	2.25	31.40	3.00	1.00	42.74	24.90	46.84	39.02	183.08	334.28	11.83	9.99
QL07BM1 7	2.30	31.80	3.01	1.00	41.26	26.20	45.02	38.70	204.22	314.80	11.43	9.29
QL14BM1 14	2.13	29.60	3.00	1.00	42.54	26.80	51.12	42.66	214.78	299.66	11.97	9.18
QL28BM1 28	2.35	32.50	3.01	1.01	40.26	24.34	53.72	45.06	242.34	339.22	11.56	9.39
QL99BM1 46	2.35	34.00	3.02	1.01	*	*	*	*	*	*	*	*
QL56BM1 56	2.55	36.40	3.02	1.02	44.68	27.50	64.24	53.16	222.36	301.28	10.78	8.59
QL99BM2 124	2.41	37.60	3.03	1.02	*	*	*	*	*	*	*	*
QL99BM3 241	2.57	38.00	3.06	1.04	32.70	*	62.54	*	390.25	*	*	*
1 2 DICHLOROETHANE .8% 50°C												
QH01DH1 1	2.32	31.60	2.91	1.05	25.72	17.48	38.28	35.12	319.96	422.94	9.38	8.00
QH07DH1 7	2.45	34.10	2.94	1.02	24.88	16.14	38.90	35.68	312.32	428.94	9.18	7.86

CHLOROSULFONATED POLVETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				1 2 DICHLOROETHANE .8% 50°C								
QH14DH1 14	2.48	34.80	2.94	1.04	24.25	16.08	39.33	35.46	329.85	426.34	8.98	7.73
QH28DH1 28	2.59	35.70	2.89	1.06	20.42	14.14	38.44	34.16	349.18	424.80	*	*
QH99DH1 46	2.41	35.70	2.78	1.04	*	*	*	*	*	*	*	*
QH56DH1 56	2.36	33.40	2.91	1.04	33.72	22.32	47.86	44.14	251.98	323.00	10.32	9.08
QH99DH2 137	2.57	38.00	2.80	1.06	*	*	*	*	*	*	*	*
QH99DH3 242	2.69	39.60	2.81	1.08	21.43	*	49.00	*	391.00	*	*	*
				1 2 DICHLOROETHANE .8% 23°C								
QL01DH1 1	2.29	30.90	3.03	1.02	30.12	19.34	39.40	33.64	273.90	374.42	9.88	8.31
QL07DH1 7	2.41	32.60	3.03	1.03	31.22	22.30	39.88	33.60	268.24	306.40	10.20	8.18
QL14DH1 14	2.29	31.50	3.04	1.02	28.16	17.70	41.24	33.68	301.16	380.22	9.27	7.53
QL28DH1 28	2.29	31.50	3.02	1.01	33.78	22.14	43.46	40.36	240.80	368.22	10.10	8.61
QL99DH1 46	2.35	32.80	3.01	1.01	*	*	*	*	*	*	*	*
QL56DH1 56	2.28	31.20	3.03	1.03	31.42	20.04	43.32	38.26	275.84	325.30	9.17	7.82
QL99DH2 137	2.36	33.20	3.00	1.00	*	*	*	*	*	*	*	*
QL99DH3 241	2.39	33.60	3.00	1.01	25.82	*	43.68	*	533.42	*	*	*
				1 2 DICHLOROETHANE .1% 50°C								
QH01DL1 1	2.24	31.40	*	1.01	33.44	22.50	40.96	37.96	247.24	357.36	10.79	8.72
QH07DL1 7	2.25	31.30	2.97	1.02	32.06	21.00	40.50	37.06	256.58	336.02	11.20	8.93
QH14DL1 14	2.27	32.30	2.95	1.00	29.26	17.64	42.50	37.64	289.78	403.48	10.68	9.12
QH28DL1 28	2.26	32.30	2.93	1.01	33.02	21.42	47.78	42.46	272.42	358.36	10.29	8.87
QH99DL1 46	2.25	32.80	2.88	1.02	*	*	*	*	*	*	*	*
QH56DL1 56	2.34	33.00	2.94	1.03	32.95	21.02	49.08	43.90	254.65	329.14	10.32	8.29
QH99DL2 137	2.40	34.80	2.91	1.03	*	*	*	*	*	*	*	*
QH99DL3 242	2.52	36.60	2.95	1.06	22.89	*	54.55	*	377.92	*	*	*
				1 2 DICHLOROETHANE .1% 23°C								
QL01DL1 1	2.17	29.80	3.00	1.01	34.52	22.52	39.50	36.08	224.30	352.22	10.85	8.42
QL07DL1 7	2.18	30.00	3.01	1.01	37.50	23.32	43.38	38.72	246.98	360.18	11.34	9.40
QL14DL1 14	2.23	30.70	3.01	1.01	29.82	19.10	40.40	35.52	281.64	378.06	10.34	8.38
QL28DL1 28	2.36	32.50	3.01	1.01	34.34	22.10	43.58	38.62	247.70	356.80	11.08	9.08
QL99DL1 46	2.16	30.60	3.00	1.00	*	*	*	*	*	*	*	*
QL56DL1 56	2.24	30.90	3.01	1.01	35.24	21.32	46.52	39.76	257.76	374.78	11.86	9.89
QL99DL2 137	2.19	31.10	3.01	0.99	*	*	*	*	*	*	*	*
QL99DL3 241	2.19	31.30	3.01	1.00	29.52	*	47.40	*	472.42	*	*	*
				1 2 DICHLOROETHANE .5% 50°C								
QH01DM1 1	2.28	31.50	2.94	1.03	27.90	17.94	39.48	35.36	297.54	412.70	9.56	7.72
QH07DM1 7	2.25	31.10	2.96	1.02	29.10	17.28	39.86	35.46	291.06	403.78	9.36	8.65
QH14DM1 14	2.43	33.80	2.94	1.04	23.42	14.80	37.62	33.70	324.28	428.40	10.54	8.79
QH28DM1 28	2.43	34.60	2.92	1.02	33.86	22.28	47.40	43.12	270.28	350.40	9.80	8.36

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				1 2 DICHLOROETHANE .5% 50°C								
QH99DM1 46	2.30	33.60	2.84	1.03	*	*	*	*	*	*	*	*
QH56DM1 56	2.35	33.80	2.85	1.05	34.04	22.82	49.60	44.12	254.54	323.64	10.22	8.85
QH99DM2 137	2.43	35.60	2.87	1.04	*	*	*	*	*	*	*	*
QH99DM3 242	2.60	37.60	2.90	1.07	22.40	*	56.57	*	416.08	*	*	*
				1 2 DICHLOROETHANE .5% 23°C								
QL01DM1 1	2.21	30.00	3.02	1.02	34.06	21.20	40.90	35.28	243.92	361.62	10.25	8.58
QL07DM1 7	2.24	30.40	3.02	1.01	32.98	19.88	44.64	36.34	248.40	377.34	10.16	8.38
QL14DM1 14	2.24	30.50	3.02	1.01	31.70	19.02	41.00	35.86	260.98	382.00	10.11	7.96
QL28DM1 28	2.39	33.50	3.00	1.00	31.78	20.42	43.00	37.46	270.58	373.60	10.37	8.47
QL99DM1 46	2.25	31.20	3.01	1.01	*	*	*	*	*	*	*	*
QL56DM1 56	2.26	31.00	3.02	1.01	33.24	20.30	44.42	39.18	258.24	368.04	10.84	9.36
QL99DM2 137	2.27	31.80	3.01	1.00	*	*	*	*	*	*	*	*
QL99DM3 241	2.32	32.40	3.02	1.01	27.12	*	44.80	*	504.33	*	*	*
				FURFURAL 8.0% 50°C								
QH01FH1 1	2.41	33.00	2.97	1.03	28.96	17.92	45.02	40.70	284.30	398.74	9.37	7.67
QH07FH1 7	2.49	34.90	2.91	1.05	28.42	17.74	47.36	42.26	289.40	375.84	9.03	7.76
QH14FH1 14	2.56	35.50	2.95	1.05	27.24	17.02	46.98	40.66	286.12	378.64	8.62	7.49
QH28FH1 28	2.75	38.00	2.96	1.06	29.46	18.88	44.22	38.74	258.76	334.18	8.18	6.83
QH99FH1 46	2.68	37.40	2.92	1.09	*	*	*	*	*	*	*	*
QH56FH1 56	2.76	38.10	2.98	1.09	27.42	17.04	50.32	44.68	260.46	336.50	6.90	6.49
QH99FH2 137	2.85	40.30	2.96	1.11	*	*	*	*	*	*	*	*
QH99FH3 242	2.91	41.40	2.99	1.13	21.98	*	33.59	*	221.50	*	*	*
				FURFURAL 8.0% 23°C								
QL01FH1 1	2.49	33.60	3.04	1.02	34.68	21.42	47.14	41.52	252.22	354.06	10.56	8.63
QL07FH1 7	2.55	34.10	3.06	1.03	31.32	18.72	45.50	37.82	259.80	367.50	9.11	7.86
QL14FH1 14	2.27	31.70	3.01	1.00	35.42	23.06	48.00	44.94	234.46	354.46	10.81	8.76
QL28FH1 28	2.68	36.20	3.05	1.04	28.90	18.58	40.36	34.82	286.54	388.18	8.99	7.49
QL99FH1 46	2.37	32.20	3.06	1.03	*	*	*	*	*	*	*	*
QL56FH1 56	2.61	35.20	3.04	1.04	28.74	17.80	43.40	37.50	289.36	398.36	9.34	8.20
QL99FH2 137	2.39	32.80	3.06	1.03	*	*	*	*	*	*	*	*
QL99FH3 241	2.44	33.30	3.07	1.04	22.16	*	41.71	*	514.33	*	*	*
				FURFURAL 1.0% 50°C								
QH01FL1 1	2.34	32.80	2.95	1.01	38.88	24.98	51.06	48.08	237.50	345.06	11.40	9.72
QH07FL1 7	2.32	32.60	2.92	1.02	36.26	22.68	53.40	49.58	256.66	356.96	10.58	9.30
QH14FL1 14	2.33	32.70	2.95	1.02	35.34	22.26	50.94	46.76	244.42	339.50	10.30	8.68
QH28FL1 28	2.31	33.30	2.92	1.01	36.00	23.16	47.54	43.48	247.72	341.04	10.68	8.55
QH99FL1 46	2.30	33.50	2.89	1.02	*	*	*	*	*	*	*	*
QH56FL1 56	2.33	33.10	2.93	1.03	36.56	23.22	55.70	49.70	242.48	321.16	10.08	8.01
QH99FL2 137	2.46	35.50	2.92	1.04	*	*	*	*	*	*	*	*
QH99FL3 242	2.59	37.00	2.95	1.06	23.46	*	54.67	*	384.42	*	*	*

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
FURFURAL 1.0% 23°C												
QL01FL1 1	2.29	31.60	3.01	1.00	45.12	29.22	55.12	48.68	217.62	310.30	12.67	10.53
QL07FL1 9	2.38	32.70	3.02	1.01	40.72	26.92	51.28	46.24	222.36	324.58	11.91	9.43
QL14FL1 14	2.24	31.10	3.00	1.01	40.56	24.32	50.88	45.06	216.46	332.96	11.71	9.64
QL28FL1 28	2.31	32.10	3.00	1.01	33.00	21.06	40.86	37.16	246.98	350.78	11.02	9.10
QL99FL1 46	2.24	31.40	3.01	1.00	*	*	*	*	*	*	*	*
QL56FL1 56	2.38	32.80	3.01	1.01	34.34	20.48	47.56	41.12	263.16	372.06	10.51	9.09
QL99FL2 137	2.27	31.80	3.01	1.00	*	*	*	*	*	*	*	*
QL99FL3 241	2.28	32.10	3.02	1.01	29.68	*	48.91	*	513.42	*	*	*
FURFURAL 4.0% 50°C												
QH01FM1 1	2.41	33.40	2.95	1.02	31.68	20.28	46.28	42.14	275.92	364.82	9.95	8.28
QH07FM1 7	2.48	34.70	2.91	1.04	31.60	20.82	48.54	45.30	275.88	372.98	10.04	8.48
QH14FM1 14	2.21	30.90	2.95	1.03	31.80	20.16	50.36	44.04	268.10	348.16	9.51	8.20
QH28FM1 28	2.36	32.50	3.03	1.02	34.30	20.78	43.14	37.80	245.92	364.36	10.24	8.73
QH99FM1 46	2.43	35.00	2.89	1.04	*	*	*	*	*	*	*	*
QH56FM1 56	2.50	35.00	2.93	1.05	34.42	21.94	54.14	49.16	242.82	323.46	8.56	7.33
QH99FM2 137	2.67	38.00	2.93	1.08	*	*	*	*	*	*	*	*
QH99FM3 242	2.65	38.10	2.94	1.08	23.28	*	50.53	*	369.33	*	*	*
FURFURAL 4.0% 23°C												
QL01FM1 1	2.35	32.10	3.03	1.01	40.34	25.12	51.20	44.88	237.96	344.16	11.81	9.62
QL07FM1 7	2.32	31.70	3.01	1.01	34.94	21.86	47.60	42.52	251.10	353.14	10.26	8.99
QL14FM1 14	2.27	30.90	3.06	1.03	28.86	17.56	43.62	38.38	274.88	380.88	8.82	7.53
QL28FM1 28	2.30	32.10	2.95	1.03	33.70	21.30	48.62	42.60	255.00	336.62	9.70	8.17
QL99FM1 46	2.32	32.40	3.02	1.01	*	*	*	*	*	*	*	*
QL56FM1 56	2.34	32.20	3.04	1.02	35.96	22.18	49.74	43.34	248.10	358.42	10.52	8.84
QL99FM2 137	2.34	32.90	3.01	1.01	*	*	*	*	*	*	*	*
QL99FM3 241	2.37	33.30	3.03	1.01	28.09	*	46.73	*	499.67	*	*	*
METHYL ETHYL KETONE 26.0% 50°C												
QH01MH1 1	2.72	39.20	2.90	1.14	18.34	10.84	35.32	30.40	369.42	476.30	5.61	4.80
QH07MH1 7	3.26	45.40	2.82	1.18	15.20	9.36	32.78	28.78	364.62	458.98	5.34	5.43
QH14MH1 14	2.94	40.70	2.88	1.16	18.54	14.00	38.60	38.52	328.14	392.02	6.24	5.65
QH28MH1 28	3.02	32.20	2.79	1.16	16.82	10.96	35.62	33.98	358.30	439.00	6.15	4.91
QH99MH1 46	2.89	44.00	2.50	1.21	*	*	*	*	*	*	*	*
QH56MH1 56	2.98	42.20	2.90	1.19	15.66	9.58	36.56	32.10	309.26	377.42	4.37	4.02
QH99MH2 137	3.31	47.30	2.27	1.20	*	*	*	*	*	*	*	*
QH99MH3 242	2.97	43.40	2.41	1.17	12.98	*	15.09	*	283.92	*	*	*

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
METHYL ETHYL KETONE 26.0% 23°C													
QL01MH1	1	2.64	35.40	3.08	1.06	26.60	16.86	38.70	32.44	290.64	385.82	7.19	6.59
QL07MH1	7	2.50	33.80	3.07	1.06	24.22	16.90	37.04	32.50	307.34	397.56	7.86	6.57
QL14MH1	14	2.61	35.50	3.05	1.06	28.42	18.48	44.92	39.82	276.74	360.62	7.88	6.61
QL28MH1	28	2.70	36.70	3.04	1.07	24.32	15.06	37.34	32.54	305.28	421.10	8.19	6.99
QL99MH1	46	2.56	35.30	3.04	1.05	*	*	*	*	*	*	*	*
QL56MH1	56	2.55	35.80	3.10	1.07	20.38	12.38	36.74	31.08	320.16	429.68	6.62	5.40
QL99MH2	137	2.58	35.60	3.05	1.05	*	*	*	*	*	*	*	*
QL99MH3	241	2.59	35.70	3.05	1.38	17.37	*	44.67	*	560.17	*	*	*
METHYL ETHYL KETONE 3.0% 50°C													
QH01ML1	1	2.17	30.70	2.93	1.02	30.96	20.30	38.48	34.20	248.80	360.26	10.14	8.31
QH07ML1	7	2.26	31.80	2.93	1.03	31.18	20.64	46.34	41.46	273.00	377.24	10.43	8.37
QH14ML1	14	2.22	31.30	2.94	1.03	33.50	21.16	49.18	45.58	261.02	359.18	10.37	8.90
QH28ML1	28	2.38	34.10	2.92	1.02	30.32	20.02	43.10	40.08	280.94	370.60	9.91	8.47
QH99ML1	46	2.38	34.80	2.85	1.03	*	*	*	*	*	*	*	*
QH56ML1	56	2.28	32.60	2.96	1.03	34.04	19.80	54.44	43.64	244.62	332.58	8.72	7.48
QH99ML2	137	2.60	37.60	2.90	1.06	*	*	*	*	*	*	*	*
QH99ML3	242	2.62	38.20	2.90	1.07	22.14	*	50.80	*	356.42	*	*	*
METHYL ETHYL KETONE 3.0% 23°C													
QL01ML1	1	2.39	32.80	3.01	1.01	33.14	21.84	38.92	33.08	226.88	327.98	10.08	8.64
QL07ML1	7	2.16	29.80	3.02	1.01	35.44	21.90	41.08	35.78	224.94	344.64	10.81	8.61
QL14ML1	14	2.27	32.00	3.00	1.00	37.16	23.58	50.78	44.36	248.52	343.02	10.89	9.23
QL28ML1	28	2.28	31.90	3.01	1.00	33.02	19.98	41.30	34.60	261.02	376.62	11.07	8.71
QL99ML1	46	2.21	31.10	3.01	1.00	*	*	*	*	*	*	*	*
QL56ML1	56	2.30	32.00	3.01	1.01	34.00	20.00	48.60	40.40	273.50	373.50	10.49	8.59
QL99ML2	137	2.23	31.40	3.01	1.00	*	*	*	*	*	*	*	*
QL99ML3	241	2.24	31.70	3.01	1.00	28.45	*	47.53	*	541.50	*	*	*
METHYL ETHYL KETONE 13.0% 50°C													
QH01MM1	1	2.49	35.90	2.90	1.07	23.30	14.98	37.52	34.70	333.60	446.70	6.63	6.36
QH07MM1	7	2.54	36.00	2.84	1.10	21.14	14.12	39.34	37.20	334.36	417.22	7.98	6.55
QH14MM1	14	2.58	36.20	2.93	1.10	25.76	17.34	48.60	41.72	303.50	360.66	8.29	7.42
QH28MM1	28	2.62	37.00	2.94	1.10	24.16	15.18	42.88	39.18	310.68	387.40	8.00	6.92
QH99MM1	46	2.81	41.60	2.76	1.14	*	*	*	*	*	*	*	*
QH56MM1	56	2.91	41.90	2.88	1.13	19.38	11.84	43.40	37.92	307.24	380.34	6.03	5.40
QH99MM2	137	2.79	41.70	2.69	1.13	*	*	*	*	*	*	*	*
QH99MM3	242	2.78	42.00	2.70	1.14	17.05	*	35.65	*	352.42	*	*	*

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

		WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
					METHYL ETHYL KETONE 13.0% 23°C								
QL01MM1	1	2.56	35.10	3.04	1.03	30.84	20.32	40.42	32.92	265.66	359.44	9.48	8.16
QL07MM1	7	2.34	31.80	3.05	1.03	25.88	16.16	35.34	30.20	294.72	410.10	8.74	7.03
QL14MM1	14	2.50	34.40	3.03	1.04	35.76	23.56	49.94	45.78	243.82	344.10	10.04	8.53
QL28MM1	28	2.37	32.60	3.05	1.11	28.16	17.18	39.32	32.98	287.00	390.26	9.38	7.45
QL99MM1	46	2.38	33.60	3.02	1.02	*	*	*	*	*	*	*	*
QL56MM1	56	2.33	32.10	3.06	1.04	25.70	16.00	41.80	35.10	302.42	397.06	8.38	6.73
QL99MM2	137	2.40	34.30	2.99	1.02	*	*	*	*	*	*	*	*
QL99MM3	240	2.43	34.60	2.98	1.01	24.41	*	46.73	*	577.42	*	*	*
					ASTM #2 OIL SATURATED 50°C								
QH010M1	1	2.27	32.10	2.96	1.02	37.94	23.92	45.14	41.34	226.22	337.96	11.27	9.04
QH070M1	7	2.51	34.90	2.96	1.05	31.10	18.78	43.66	40.22	275.30	395.54	10.23	8.28
QH140M1	14	2.35	33.10	2.93	1.02	34.68	22.84	49.02	45.70	250.58	333.10	11.24	8.68
QH280M1	28	2.37	33.50	2.93	1.03	35.42	22.36	51.06	47.92	247.94	339.74	10.12	8.48
QH990M1	46	2.29	33.10	2.90	1.02	*	*	*	*	*	*	*	*
QH560M1	56	2.36	32.90	2.95	1.03	34.58	21.82	56.22	51.72	249.88	324.92	9.30	7.98
QH990M2	133	2.50	35.70	2.95	1.05	*	*	*	*	*	*	*	*
QH990M3	242	2.73	37.70	3.00	1.08	22.74	*	56.18	*	364.00	*	*	*
					ASTM #2 OIL SATURATED 23°C								
QL010M1	1	2.15	29.70	3.01	1.00	40.28	26.24	46.20	41.04	207.00	316.12	12.24	9.77
QL070M1	7	2.33	32.10	3.01	1.00	37.82	24.22	44.22	37.78	242.36	346.90	11.46	9.05
QL140M1	14	2.25	31.10	3.01	1.01	38.14	24.14	47.48	42.38	228.08	321.28	11.20	9.77
QL280M1	28	2.33	32.10	3.01	1.01	39.96	24.92	49.64	44.60	216.90	333.18	11.55	9.35
QL990M1	46	2.17	30.80	3.00	1.00	*	*	*	*	*	*	*	*
QL560M1	56	2.25	31.00	3.02	1.01	38.30	23.48	50.98	45.80	230.64	341.34	11.25	9.11
QL990M2	106	2.23	31.80	3.02	1.00	*	*	*	*	*	*	*	*
QL990M3	241	2.27	31.90	3.03	1.01	28.60	*	43.94	*	532.67	*	*	*
					ASTM #2 OIL 100.0% 50°C								
QH010P1	1	2.45	34.50	2.99	1.04	29.16	17.04	39.36	35.78	256.94	381.48	8.29	7.13
QH070P1	7	3.39	44.30	2.97	1.23	12.72	6.40	32.62	30.98	364.28	538.98	4.69	5.09
QH140P1	14	3.64	44.60	2.81	1.39	7.50	7.73	27.40	24.75	397.46	471.18	3.48	4.07
QH280P1	28	4.10	31.80	2.78	1.42	6.06	7.28	24.52	24.65	382.04	443.80	2.92	3.17
QH990P1	46	4.40	55.70	2.54	1.48	*	*	*	*	*	*	*	*
QH560P1	56	3.85	48.10	2.85	1.41	7.44	7.28	27.08	27.40	338.06	435.50	2.71	2.54
QH990P2	128	4.40	59.90	2.47	1.51	*	*	*	*	*	*	*	*
QH990P3	242	4.26	59.70	2.46	1.51	2.74	*	25.84	*	457.75	*	*	*

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
ASTM #2 OIL 100.0% 23°C												
QL010P1 1	2.19	30.40	3.00	1.00	42.72	27.46	45.88	40.04	200.58	315.96	11.86	9.33
QL070P1 7	2.21	30.60	3.01	*	42.82	27.15	49.84	42.35	225.00	311.98	11.30	9.52
QL140P1 14	2.23	30.80	3.02	1.01	42.50	26.92	49.12	41.22	202.22	293.14	10.79	9.28
QL280P1 28	2.34	32.40	3.03	1.02	39.22	26.24	49.32	44.26	231.46	322.02	11.02	8.09
QL990P1 46	2.29	31.70	3.04	1.02	*	*	*	*	*	*	*	*
QL560P1 56	2.32	31.70	3.06	1.03	37.38	23.42	48.02	42.48	229.72	320.56	10.43	8.12
QL990P2 128	2.38	32.40	3.08	1.04	*	*	*	*	*	*	*	*
QL990P3 241	2.45	33.50	3.11	1.05	28.52	*	47.68	*	457.42	*	*	*
PHENOL 8.0% 50°C												
QH01PH1 1	2.43	33.90	2.98	1.04	25.64	16.54	47.56	43.58	313.44	417.16	8.25	7.76
QH07PH1 7	2.54	35.30	2.98	1.06	25.30	14.82	49.40	43.74	325.92	434.28	8.49	7.26
QH14PH1 14	2.78	38.80	2.95	1.07	14.60	6.32	37.88	35.58	306.54	430.24	7.63	6.82
QH28PH1 28	2.94	40.50	3.97	1.08	21.32	12.56	48.68	43.12	324.62	423.82	6.97	6.06
QH99PH1 46	2.83	39.50	2.96	1.10	*	*	*	*	*	*	*	*
QH56PH1 56	2.80	37.50	3.03	1.10	21.18	12.32	46.50	42.64	302.36	398.92	6.10	5.66
QH99PH2 137	3.04	41.70	3.00	1.13	*	*	*	*	*	*	*	*
QH99PH3 242	3.15	42.90	3.03	1.15	13.11	*	33.73	*	441.67	*	*	*
PHENOL 8.0% 23°C												
QL01PH1 1	2.33	32.30	3.02	1.01	35.18	20.66	42.34	37.00	223.78	389.18	10.29	8.57
QL07PH1 7	2.49	34.90	3.03	1.02	27.32	17.04	43.02	37.40	303.78	423.74	9.29	7.61
QL14PH1 14	2.31	31.80	3.05	1.03	*	*	*	*	282.78	429.66	9.79	7.59
QL28PH1 28	2.40	32.70	3.05	1.03	28.36	17.00	47.24	41.00	304.26	420.94	8.77	7.43
QL99PH1 46	2.47	34.20	3.05	1.03	*	*	*	*	*	*	*	*
QL56PH1 56	2.32	31.50	3.06	1.03	27.92	15.96	39.28	36.92	312.66	435.38	9.24	7.57
QL99PH2 137	2.48	34.40	3.05	1.02	*	*	*	*	*	*	*	*
QL99PH3 241	2.51	34.70	3.06	1.03	21.23	*	40.84	*	613.08	*	*	*
PHENOL 1.0% 50°C												
QH01PL1 1	2.23	31.50	2.95	1.00	38.18	21.30	52.44	37.38	231.84	359.92	10.86	9.24
QH07PL1 7	2.27	32.20	2.93	1.02	38.82	24.96	55.06	51.42	248.10	346.88	11.25	10.15
QH14PL1 14	2.17	30.90	2.93	1.02	27.14	14.78	44.26	40.90	263.16	351.14	10.69	9.18
QH28PL1 28	2.47	34.90	2.92	1.02	37.32	23.50	57.70	50.16	257.90	337.88	9.98	8.54
QH99PL1 46	2.35	34.30	2.88	1.02	*	*	*	*	*	*	*	*
QH56PL1 56	2.25	31.60	2.95	1.02	30.70	20.12	44.96	42.58	263.18	344.32	9.19	7.52
QH99PL2 137	2.57	37.10	2.91	1.04	*	*	*	*	*	*	*	*
QH99PL3 242	2.74	39.40	2.95	1.07	21.40	*	58.12	*	386.08	*	*	*

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
PHENOL 1.0% 23°C												
QL01PL1 1	2.15	30.40	2.99	0.99	43.38	27.02	53.54	41.04	192.98	305.86	12.01	9.77
QL07PL1 7	2.17	30.00	3.01	1.01	42.36	26.64	53.34	47.16	235.10	329.16	12.51	10.31
QL14PL1 14	2.19	30.30	3.01	1.01	38.30	23.56	44.20	39.80	248.40	370.28	11.45	9.64
QL28PL1 28	2.19	30.60	3.00	1.00	39.62	24.92	52.48	45.28	241.60	334.66	11.33	9.32
QL99PL1 46	2.26	31.60	3.00	1.00	*	*	*	*	*	*	*	*
QL56PL1 56	2.14	29.60	3.01	1.01	38.20	22.74	53.44	40.84	239.96	364.06	10.65	9.03
QL99PL2 137	2.27	31.70	3.00	1.00	*	*	*	*	*	*	*	*
QL99PL3 241	2.26	31.80	3.01	1.00	30.04	*	48.29	*	514.58	*	*	*
PHENOL 4.0% 50°C												
QH01PM1 1	2.27	31.50	2.97	1.02	29.24	19.60	39.48	43.34	266.58	395.02	9.85	8.19
QH07PM1 7	2.41	34.40	2.93	1.01	30.42	19.30	50.96	46.06	293.62	385.58	9.84	8.04
QH14PM1 14	2.29	32.60	2.93	1.03	*	*	*	*	289.42	397.22	9.41	7.85
QH28PM1 28	2.34	32.90	2.93	1.04	28.94	17.28	53.22	45.52	290.86	364.56	8.13	7.17
QH99PM1 46	2.51	36.00	2.89	1.05	*	*	*	*	*	*	*	*
QH56PM1 56	2.43	34.50	2.97	1.04	28.66	16.68	53.00	43.18	279.74	393.10	8.29	7.32
QH99PM2 137	2.96	41.20	2.97	1.11	*	*	*	*	*	*	*	*
QH99PM3 242	3.10	43.10	3.01	1.13	16.15	*	42.73	*	391.00	*	*	*
PHENOL 4.0% 23°C												
QL01PM1 1	2.27	31.80	3.00	1.00	37.36	25.86	48.02	43.52	225.82	296.48	11.82	8.97
QL07PM1 7	2.24	30.60	3.04	1.02	33.34	20.68	46.32	40.02	277.40	373.40	10.60	8.37
QL14PM1 14	2.26	31.00	3.04	1.02	*	*	*	*	288.72	395.30	9.83	8.20
QL28PM1 28	2.38	32.80	3.03	1.02	33.94	19.94	51.44	43.58	279.14	377.24	9.77	8.11
QL99PM1 46	2.32	32.50	3.02	1.01	*	*	*	*	*	*	*	*
QL56PM1 56	2.27	30.70	3.01	1.02	29.34	18.78	46.18	43.50	274.10	380.70	9.33	7.41
QL99PM2 137	2.33	32.70	3.03	1.01	*	*	*	*	*	*	*	*
QL99PM3 241	2.34	32.90	3.03	1.01	23.77	*	40.48	*	584.33	*	*	*
SODIUM CHLORIDE 35.0% 50°C												
QH01SH1 1	2.18	30.60	2.95	1.01	40.26	25.54	45.54	40.80	194.48	324.48	11.40	9.33
QH07SH1 7	2.23	31.80	2.91	1.01	40.30	27.56	44.44	39.06	209.82	314.46	12.09	9.77
QH14SH1 14	2.24	31.50	2.91	1.01	42.28	27.36	50.58	45.72	215.56	311.86	12.24	9.63
QH28SH1 28	2.22	31.40	2.91	1.01	39.68	25.76	45.54	39.64	208.20	314.08	11.60	9.10
QH99SH1 46	2.14	31.00	2.88	1.01	*	*	*	*	*	*	*	*
QH56SH1 56	2.39	34.00	2.95	1.01	41.84	28.24	52.20	46.00	210.00	273.86	11.16	9.89
QH99SH2 131	2.14	31.30	2.88	1.01	*	*	*	*	*	*	*	*
QH99SH3 242	2.13	31.40	2.89	1.01	37.46	*	53.63	*	420.50	*	*	*

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
				SODIUM CHLORIDE 35.0% 23°C								
QL01SH1 1	2.16	30.10	3.00	1.00	39.26	24.92	42.18	37.72	181.80	320.86	12.22	10.11
QL07SH1 7	2.23	31.00	3.01	1.00	43.38	27.38	45.86	37.30	206.78	297.06	12.19	9.66
QL14SH1 14	2.12	29.50	3.00	1.00	41.80	27.42	46.42	41.16	196.64	313.88	12.62	10.14
QL28SH1 28	2.26	31.40	3.01	1.00	41.94	26.54	48.08	42.62	197.82	312.24	11.87	9.63
QL99SH1 46	2.13	30.10	2.99	0.99	*	*	*	*	*	*	*	*
QL56SH1 56	2.20	30.70	3.00	1.00	41.34	26.58	50.40	41.82	209.16	280.86	12.30	9.51
QL99SH2 131	2.13	30.20	2.99	0.99	*	*	*	*	*	*	*	*
QL99SH3 241	2.13	30.50	2.99	0.99	34.78	*	42.92	*	436.17	*	*	*
				SODIUM CHLORIDE 10.0% 50°C								
QH01SM1 1	2.39	33.60	2.94	1.01	38.48	24.58	42.50	37.40	197.12	303.56	10.49	9.24
QH07SM1 7	2.28	32.30	2.91	1.01	38.32	24.60	44.38	40.42	229.54	333.38	11.76	9.34
QH14SM1 14	2.26	31.90	2.92	1.01	37.10	25.94	47.86	45.06	235.84	325.16	11.80	9.26
QH28SM1 28	2.14	30.40	2.93	1.01	36.10	22.58	44.14	39.00	238.02	335.32	10.70	8.32
QH99SM1 46	2.18	31.50	2.88	1.01	*	*	*	*	*	*	*	*
QH56SM1 56	2.09	29.50	2.93	1.01	39.00	26.14	50.66	46.62	228.48	305.60	11.23	8.94
QH99SM2 124	2.17	31.50	2.88	1.01	*	*	*	*	*	*	*	*
QH99SM3 242	2.16	31.70	2.88	1.00	36.64	*	55.17	*	390.50	*	*	*
				SODIUM CHLORIDE 10.0% 23°C								
QL01SM1 1	2.06	28.60	3.00	1.00	38.90	23.78	43.58	37.16	217.68	325.72	11.67	9.42
QL07SM1 7	2.22	31.00	3.01	1.00	41.30	26.20	44.30	38.82	206.40	324.28	11.99	9.44
QL14SM1 14	2.22	30.90	3.00	1.00	42.78	26.50	49.34	41.18	210.20	287.44	12.07	9.58
QL28SM1 28	2.18	30.30	3.00	1.01	39.82	26.22	48.64	42.50	220.26	305.12	11.57	9.28
QL99SM1 46	2.16	30.60	2.99	0.99	*	*	*	*	*	*	*	*
QL56SM1 56	2.18	31.00	2.99	0.99	41.14	26.42	51.34	46.18	222.34	317.96	11.73	9.60
QL99SM2 124	2.16	30.80	2.99	0.99	*	*	*	*	*	*	*	*
QL99SM3 241	2.17	30.80	2.99	0.99	33.93	*	48.37	*	493.83	*	*	*
				WATER 100.0% 50°C								
QH01WP1 1	2.27	31.90	2.94	1.01	43.00	27.44	48.98	43.24	186.54	302.68	11.74	9.66
QH07WP1 7	2.34	33.50	2.92	1.02	34.36	21.94	44.90	40.44	259.58	353.26	10.81	9.07
QH14WP1 14	2.33	32.80	2.93	1.02	32.04	21.70	47.12	44.90	255.82	351.00	10.41	8.43
QH28WP1 28	2.38	33.50	2.93	1.02	34.35	22.34	49.30	44.18	268.15	353.72	10.97	8.95
QH99WP1 46	2.34	34.30	2.89	1.02	*	*	*	*	*	*	*	*
QH56WP1 56	2.38	33.60	2.93	1.03	34.34	21.44	55.70	50.20	254.00	332.22	9.76	8.05
QH99WP2 122	2.49	35.80	2.92	1.03	*	*	*	*	*	*	*	*
QH99WP3 242	2.64	38.30	2.95	1.06	23.78	*	55.10	*	357.83	*	*	*

CHLOROSULFONATED POLYETHYLENE: AVERAGE FINAL PROPERTIES

	WEIGHT (gram)	THICKNESS (mil)	LENGTH (inch)	WIDTH (inch)	S-100 MODULUS M (lb/ inch width)	S-100 MODULUS T (lb/ inch width)	BREAKING FACTOR M (lb/ inch width)	BREAKING FACTOR T (pound/ inch width)	ELONGATION AT BREAK M (inch)	ELONGATION AT BREAK T (inch)	TEAR RESISTANCE M (lb)	TEAR RESISTANCE T (lb)
WATER 100.0% 23°C												
QL01WP1 1	2.16	29.90	3.00	1.00	38.04	25.26	44.34	39.04	223.12	308.26	11.84	9.34
QL07WP1 7	2.29	31.70	3.01	1.00	43.20	28.18	48.18	42.44	195.26	308.64	12.49	10.20
QL14WP1 14	2.12	30.10	3.01	1.00	41.76	27.08	50.04	44.22	213.14	312.68	11.94	9.66
QL28WP1 28	2.34	32.30	3.01	1.01	38.76	23.64	47.84	42.50	225.54	335.62	10.93	9.31
QL99WP1 46	2.23	31.40	3.00	0.99	*	*	*	*	*	*	*	*
QL56WP1 56	2.31	31.90	3.01	1.00	39.66	24.04	52.14	46.98	228.86	329.82	11.95	9.82
QL99WP2 122	2.25	31.50	3.00	1.00	*	*	*	*	*	*	*	*
QL99WP3 241	2.26	32.00	3.00	0.99	31.75	*	43.51	*	461.83	*	*	*
POTASSIUM DICHROMATE 10.0% 50°C												
QH01XM1 1	2.27	31.70	2.96	1.01	40.20	26.20	50.92	45.92	229.68	314.04	11.33	9.72
QH07XM1 7	2.12	29.80	2.93	1.01	37.00	24.30	47.06	44.52	230.88	325.80	11.13	9.18
QH14XM1 14	2.27	32.10	2.93	1.01	37.14	24.16	48.28	46.54	219.14	324.84	11.28	9.13
QH28XM1 28	2.15	30.50	2.93	1.01	31.28	20.32	41.76	38.02	256.14	354.64	10.31	8.53
QH99XM1 46	2.19	31.80	2.88	1.01	*	*	*	*	*	*	*	*
QH56XM1 56	2.09	29.50	2.93	1.01	36.94	24.82	53.46	48.86	238.88	318.40	10.54	8.77
QH99XM2 132	2.19	31.90	2.88	1.01	*	*	*	*	*	*	*	*
QH99XM3 242	2.19	32.00	2.87	1.01	32.98	*	55.53	*	435.17	*	*	*
POTASSIUM DICHROMATE 10.0% 23°C												
QL01XM1 1	2.28	31.60	3.00	1.00	45.40	28.74	52.28	44.50	200.12	294.52	12.34	9.94
QL07XM1 7	2.27	31.30	3.02	1.00	41.34	26.56	48.92	43.26	205.50	311.72	11.76	9.75
QL14XM1 14	2.23	30.90	3.01	1.01	39.72	26.62	50.24	44.66	217.96	301.62	11.84	9.64
QL28XM1 28	2.29	31.70	3.01	1.00	41.32	26.30	48.06	42.54	206.00	314.68	11.50	9.70
QL99XM1 46	2.19	31.00	2.99	1.00	*	*	*	*	*	*	*	*
QL56XM1 56	2.45	33.90	3.01	1.01	40.84	25.10	52.06	46.34	229.52	318.50	11.75	9.33
QL99XM2 132	2.19	31.00	2.99	1.00	*	*	*	*	*	*	*	*
QL99XM3 241	2.19	31.20	2.98	0.99	32.29	*	41.72	*	451.75	*	*	*

CSPE_LW :   STATISTICS

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

		NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
HYDROCHLORIC ACID 10.0% 50°C													
QH01AM1	1	5	1.000	5	2.280	5	3.010	5	11.850	5	0.100	5	0.220
QH07AM1	7	5	2.160	5	1.620	5	13.010	5	11.040	5	0.270	5	0.135
QH14AM1	14	5	0.939	5	1.085	5	5.951	5	15.407	5	0.359	5	0.082
QH28AM1	28	5	1.830	5	0.680	5	15.160	5	4.790	5	0.060	5	0.210
QH56AM1	56	5	0.298	5	0.640	5	9.162	5	6.387	5	0.290	5	0.071
HYDROCHLORIC ACID 10.0% 23°C													
QL01AM1	1	5	1.860	5	1.570	5	12.900	5	13.950	5	0.200	5	0.090
QL07AM1	7	5	0.771	5	1.344	5	9.804	5	18.963	5	0.223	5	0.125
QL14AM1	14	5	3.825	5	1.216	5	7.878	5	12.174	5	0.242	5	0.188
QL28AM1	28	5	1.645	5	1.611	5	12.667	5	15.671	5	0.132	5	0.067
QL56AM1	56	5	2.066	5	1.470	5	17.786	5	18.052	5	0.159	5	0.283
SODIUM HYDROXIDE 10.0% 50°C													
QH01BM1	1	5	2.278	5	0.956	5	18.418	5	21.007	5	0.507	5	0.180
QH07BM1	7	5	1.340	5	0.900	5	5.160	5	9.730	5	0.240	5	0.160
QH14BM1	14	5	1.649	5	0.686	5	7.591	5	9.161	5	0.194	5	0.191
QH28BM1	28	5	1.367	5	0.923	5	12.572	5	4.221	5	0.190	5	0.133
QH56BM1	56	5	2.489	5	1.136	5	7.682	5	5.656	5	0.082	5	0.144
SODIUM HYDROXIDE 10.0% 23°C													
QL01BM1	1	5	1.880	5	0.638	5	32.547	5	8.893	5	0.201	5	0.140
QL07BM1	7	5	2.372	5	0.936	5	10.530	5	5.863	5	0.127	5	0.221
QL14BM1	14	5	1.570	5	2.145	5	12.899	5	12.578	5	0.433	5	0.191
QL28BM1	28	5	2.292	5	0.603	5	4.270	5	6.096	5	0.270	5	0.164
QL56BM1	56	5	0.946	5	1.226	5	5.499	5	7.703	5	0.220	5	0.126
1 2 DICHLOROETHANE .8% 50°C													
QH01DH1	1	5	1.033	5	0.965	5	18.134	5	7.502	5	0.284	5	0.229
QH07DH1	7	5	0.860	5	0.510	5	5.240	5	9.640	5	0.240	5	0.300
QH14DH1	14	5	0.695	5	0.770	5	7.567	5	19.000	5	0.080	5	0.180
QH28DH1	28	5	0.602	5	0.482	5	9.075	5	11.349	*	*	*	*
QH56DH1	56	5	1.721	5	2.469	5	8.554	5	20.638	5	0.091	5	0.183
1 2 DICHLOROETHANE .8% 23°C													
QL01DH1	1	5	0.620	5	0.880	5	14.126	5	8.786	5	0.196	5	0.183
QL07DH1	7	5	2.090	5	0.896	5	26.060	5	89.700	5	0.230	5	0.180
QL14DH1	14	5	0.770	5	2.360	5	12.300	5	30.500	5	0.230	5	0.160
QL28DH1	28	5	1.905	5	0.578	5	15.678	5	13.270	5	0.037	5	0.332
QL56DH1	56	5	0.488	5	0.651	5	9.683	5	9.726	5	0.208	5	0.072

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				1 2 DICHLOROETHANE .1% 50°C								
QH01DL1 1	5	1.128	5	1.031	5	10.182	5	21.216	5	0.244	5	0.294
QH07DL1 7	5	1.400	5	1.060	5	15.010	5	56.700	5	0.490	5	0.120
QH14DL1 14	5	0.760	5	0.560	5	12.490	5	13.510	5	0.320	5	0.280
QH28DL1 28	5	2.347	5	1.520	5	11.848	5	9.810	5	0.201	5	0.086
QH56DL1 56	5	2.340	5	2.505	5	6.750	5	13.180	5	0.493	5	0.114
				1 2 DICHLOROETHANE .1% 23°C								
QL01DL1 1	5	1.395	5	0.865	5	11.228	5	10.712	5	0.178	5	0.130
QL07DL1 7	5	1.400	5	0.620	5	17.700	5	8.140	5	0.270	5	0.080
QL14DL1 14	5	1.880	5	2.180	5	8.700	5	17.360	5	0.210	5	0.350
QL28DL1 28	5	1.594	5	1.169	5	18.150	5	12.569	5	0.113	5	0.243
QL56DL1 56	5	1.892	5	1.573	5	17.944	5	17.763	5	0.273	5	0.277
				1 2 DICHLOROETHANE .5% 50°C								
QH01DM1 1	5	2.218	5	0.610	5	22.112	5	15.973	5	0.303	5	0.204
QH07DM1 7	5	2.230	5	0.480	5	17.180	5	10.920	5	0.090	5	0.280
QH14DM1 14	5	1.006	5	0.680	5	5.280	5	11.740	5	0.100	5	0.250
QH28DM1 28	5	0.908	5	0.900	5	9.743	5	12.900	5	0.210	5	0.208
QH56DM1 56	5	0.401	5	1.195	5	8.189	5	12.958	5	0.230	5	0.199
				1 2 DICHLOROETHANE .5% 23°C								
QL01DM1 1	5	1.209	5	0.934	5	17.909	5	12.333	5	0.217	5	0.265
QL07DM1 7	5	1.494	5	0.370	5	14.161	5	8.200	5	0.210	5	0.140
QL14DM1 14	5	1.380	5	0.840	5	12.670	5	8.660	5	0.063	5	0.243
QL28DM1 28	5	1.848	5	0.569	5	8.444	5	10.379	5	0.160	5	0.084
QL56DM1 56	5	1.507	5	1.857	5	16.114	5	18.876	5	0.140	5	0.210
				FURFURAL 8.0% 50°C								
QH01FH1 1	5	2.010	5	1.480	5	16.590	5	8.200	5	0.130	5	0.090
QH07FH1 7	5	1.960	5	1.040	5	12.610	5	13.560	5	0.060	5	0.060
QH14FH1 14	5	1.344	5	0.429	5	5.456	5	6.751	5	0.149	5	0.143
QH28FH1 28	5	1.730	5	1.270	5	12.210	5	8.120	5	0.320	5	0.190
QH56FH1 56	5	2.109	5	0.869	5	9.839	5	6.168	5	0.181	5	0.240
				FURFURAL 8.0% 23°C								
QL01FH1 1	5	1.380	5	1.450	5	15.340	5	10.330	5	0.018	5	0.150
QL07FH1 7	5	1.390	5	1.001	5	12.390	5	17.700	5	0.140	5	0.160
QL14FH1 14	5	2.035	5	1.474	5	14.195	5	8.312	5	0.156	5	0.176
QL28FH1 28	5	1.340	5	0.660	5	13.940	5	10.300	5	0.190	5	0.230
QL56FH1 56	5	1.937	5	0.612	5	12.166	5	6.056	5	0.187	5	0.104

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				FURFURAL 1.0% 50°C								
QH01FL1 1	5	3.590	5	0.730	5	7.780	5	6.630	5	0.230	5	0.120
QH07FL1 7	5	0.940	5	0.610	5	6.310	5	2.850	5	0.160	5	0.210
QH14FL1 14	5	1.646	5	1.886	5	13.208	5	14.567	5	0.320	5	0.168
QH28FL1 28	5	2.930	5	2.370	5	18.550	5	8.040	5	0.150	5	0.110
QH56FL1 56	5	3.210	5	2.228	5	7.299	5	8.969	5	0.343	5	0.211
				FURFURAL 1.0% 23°C								
QL01FL1 1	5	1.240	5	0.690	5	5.690	5	8.640	5	0.120	5	0.290
QL07FL1 9	5	2.139	5	2.134	5	13.536	5	16.376	5	0.270	5	0.129
QL14FL1 14	5	2.511	5	2.209	5	18.550	5	20.436	5	0.207	5	0.274
QL28FL1 28	5	2.300	5	1.690	5	16.330	5	23.100	5	0.170	5	0.100
QL56FL1 56	5	0.813	5	0.858	5	12.714	5	12.143	5	0.120	5	0.157
				FURFURAL 4.0% 50°C								
QH01FM1 1	5	2.300	5	1.140	5	8.310	5	7.220	5	0.229	5	0.130
QH07FM1 7	5	1.140	5	1.270	5	14.610	5	13.500	5	0.090	5	0.178
QH14FM1 14	5	0.977	5	1.171	5	4.165	5	14.796	5	0.078	5	0.247
QH28FM1 28	5	1.610	5	1.340	5	13.240	5	20.230	5	0.180	5	0.120
QH56FM1 56	5	0.953	5	0.585	5	3.113	5	4.569	5	0.119	5	0.097
				FURFURAL 4.0% 23°C								
QL01FM1 1	5	2.240	5	1.480	5	12.030	5	9.500	5	0.140	5	0.090
QL07FM1 7	5	2.194	5	1.219	5	17.418	5	7.603	5	0.123	5	0.239
QL14FM1 14	5	0.301	5	0.569	5	13.471	5	10.036	5	0.193	5	0.129
QL28FM1 28	5	1.390	5	0.950	5	11.870	5	10.830	5	0.100	5	0.080
QL56FM1 56	5	1.756	5	0.649	5	18.566	5	7.477	5	0.102	5	0.128
				METHYL ETHYL KETONE 26.0% 50°C								
QH01MH1 1	5	0.873	5	2.094	5	11.544	5	19.519	5	0.151	5	0.085
QH07MH1 7	5	0.687	5	0.822	5	6.589	5	5.886	5	0.333	5	0.376
QH14MH1 14	5	0.880	5	1.310	5	6.830	5	5.710	5	0.180	5	0.280
QH28MH1 28	5	1.078	5	1.676	5	5.217	5	19.029	5	0.131	5	0.298
QH56MH1 56	5	0.380	5	1.027	5	7.719	5	7.656	5	0.193	5	0.137
				METHYL ETHYL KETONE 26.0% 23°C								
QL01MH1 1	5	0.941	5	0.611	5	5.252	5	11.616	5	0.202	5	0.179
QL07MH1 7	5	1.053	5	0.697	5	8.257	5	5.148	5	0.180	5	0.297
QL14MH1 14	5	1.010	5	0.400	5	7.070	5	11.530	5	0.170	5	0.260
QL28MH1 28	5	1.433	5	0.619	5	12.485	5	10.097	5	0.148	5	0.325
QL56MH1 56	5	1.062	5	1.016	5	4.108	5	14.381	5	0.172	5	0.100

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
METHYL ETHYL KETONE 3.0% 50°C												
QH01ML1 1	5	1.038	5	1.351	5	17.094	5	15.719	5	0.099	5	0.146
QH07ML1 7	5	1.553	5	0.502	5	10.108	5	11.317	5	0.098	5	0.167
QH14ML1 14	5	1.680	5	0.560	5	10.150	5	2.610	5	0.060	5	0.410
QH28ML1 28	5	2.016	5	1.437	5	4.311	5	14.771	5	0.176	5	0.045
QH56ML1 56	5	1.437	5	0.665	5	5.239	5	10.336	5	0.180	5	0.134
METHYL ETHYL KETONE 3.0% 23°C												
QL01ML1 1	5	1.110	5	1.085	5	11.769	5	40.087	5	0.246	5	0.178
QL07ML1 7	5	2.290	5	1.750	5	25.370	5	27.801	5	0.093	5	0.141
QL14ML1 14	5	0.670	5	0.860	5	7.740	5	14.750	5	0.160	5	0.220
QL28ML1 28	5	0.882	5	1.614	5	25.321	5	22.141	5	0.102	5	0.148
QL56ML1 56	5	1.000	5	1.000	5	13.500	5	8.800	5	0.288	5	0.201
METHYL ETHYL KETONE 13.0% 50°C												
QH01MM1 1	5	1.356	5	0.746	5	6.917	5	9.808	5	0.053	5	0.174
QH07MM1 7	5	1.350	5	1.277	5	4.232	5	3.417	5	0.707	5	0.172
QH14MM1 14	5	0.840	5	4.340	5	2.890	5	40.370	5	0.180	5	0.240
QH28MM1 28	5	1.648	5	1.169	5	4.664	5	11.745	5	0.165	5	0.193
QH56MM1 56	5	1.406	5	1.003	5	5.442	5	5.088	5	0.247	5	0.085
METHYL ETHYL KETONE 13.0% 23°C												
QL01MM1 1	5	0.266	5	0.147	5	5.932	5	4.618	5	0.198	5	0.346
QL07MM1 7	5	1.087	5	0.764	5	18.336	5	17.026	5	0.262	5	0.137
QL14MM1 14	5	1.510	5	1.460	5	7.010	5	4.010	5	0.149	5	0.251
QL28MM1 28	5	1.299	5	1.880	5	12.366	5	25.666	5	0.160	5	0.045
QL56MM1 56	5	1.049	5	1.277	5	6.373	5	10.159	5	0.225	5	0.232
ASTM #2 OIL SATURATED 50°C												
QH01OM1 1	5	2.309	5	0.832	5	23.144	5	6.193	5	0.101	5	0.188
QH07OM1 7	5	1.303	5	1.184	5	14.171	5	26.235	5	0.240	5	0.349
QH14OM1 14	5	3.503	5	2.784	5	8.044	5	19.616	5	0.195	5	0.120
QH28OM1 28	5	1.499	5	1.665	5	12.341	5	10.460	5	0.220	5	0.265
QH56OM1 56	5	1.300	5	1.042	5	5.498	5	6.907	5	0.697	5	0.068
ASTM #2 OIL SATURATED 23°C												
QL01OM1 1	5	1.445	5	1.436	5	3.737	5	5.642	5	0.215	5	0.134
QL07OM1 7	5	0.841	5	0.433	5	9.823	5	18.291	5	0.174	5	0.054
QL14OM1 14	5	1.519	5	1.424	5	11.806	5	14.402	5	0.228	5	0.170
QL28OM1 28	5	1.736	5	2.051	5	17.726	5	16.588	5	0.249	5	0.095
QL56OM1 56	5	2.622	5	1.701	5	10.784	5	9.377	5	0.242	5	0.131

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
				ASTM #2 OIL 100.0% 50°C								
QH010P1 1	5	0.670	5	1.429	5	9.230	5	15.535	5	0.174	5	0.168
QH070P1 7	5	1.220	5	1.600	5	22.400	5	17.800	5	0.250	5	0.160
QH140P1 14	5	1.344	4	0.819	5	25.194	4	19.463	5	0.116	5	0.174
QH280P1 28	5	1.728	5	0.570	5	12.806	5	5.980	5	0.148	5	0.091
QH560P1 56	5	3.095	5	2.200	5	20.632	5	14.160	5	0.082	5	0.120
				ASTM #2 OIL 100.0% 23°C								
QL010P1 1	5	1.348	5	0.868	5	16.734	5	6.435	5	0.241	5	0.159
QL070P1 7	5	0.867	4	0.742	5	8.338	4	8.520	5	0.262	5	0.254
QL140P1 14	5	1.431	5	1.274	5	10.781	5	9.798	5	0.155	5	0.196
QL280P1 28	5	2.467	5	1.777	5	9.266	5	23.405	5	0.145	5	0.094
QL560P1 56	5	1.949	5	0.758	5	15.599	5	14.693	5	0.253	5	0.296
				PHENOL 8.0% 50°C								
QH01PH1 1	5	1.480	5	1.677	5	7.211	5	12.263	5	0.146	5	0.201
QH07PH1 7	5	0.562	5	0.791	5	7.153	5	12.386	5	0.145	5	0.169
QH14PH1 14	5	1.690	5	1.650	5	16.000	5	7.020	5	0.310	5	0.046
QH28PH1 28	5	0.483	5	1.136	5	5.462	5	19.296	5	0.210	5	0.118
QH56PH1 56	5	1.220	5	1.240	5	4.600	5	6.190	5	0.102	5	0.105
				PHENOL 8.0% 23°C								
QL01PH1 1	5	3.847	5	0.648	5	26.123	5	10.794	5	0.364	5	0.185
QL07PH1 7	5	1.932	5	1.101	5	19.782	5	16.898	5	0.264	5	0.164
QL14PH1 14	*	*	*	*	5	30.314	5	8.110	5	0.049	5	0.091
QL28PH1 28	5	2.442	5	1.680	5	17.323	5	19.080	5	0.089	5	0.160
QL56PH1 56	5	0.554	5	2.270	5	13.590	5	12.950	5	0.068	5	0.197
				PHENOL 1.0% 50°C								
QH01PL1 1	5	1.986	5	0.747	5	9.591	5	2.939	5	0.147	5	0.240
QH07PL1 7	5	2.897	5	1.303	5	12.892	5	8.525	5	0.801	5	0.813
QH14PL1 14	5	1.660	5	0.680	5	3.510	5	15.570	5	0.180	5	0.080
QH28PL1 28	5	0.810	5	0.830	5	4.400	5	11.830	5	0.060	5	0.090
QH56PL1 56	5	2.080	5	2.630	5	7.010	5	17.850	5	0.161	5	0.111
				PHENOL 1.0% 23°C								
QL01PL1 1	5	1.861	5	4.818	5	13.117	5	30.667	5	0.241	5	0.134
QL07PL1 7	5	1.826	5	0.931	5	11.109	5	14.394	5	0.463	5	0.191
QL14PL1 14	5	1.740	5	0.750	5	0.940	5	7.050	5	0.160	5	0.192
QL28PL1 28	5	1.257	5	2.176	5	7.374	5	25.033	5	0.201	5	0.176
QL56PL1 56	5	1.419	5	2.260	5	8.708	5	7.160	5	0.298	5	0.100

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

	NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
PHENOL 4.0% 50°C												
QH01PM1 1	5	1.620	5	3.219	5	20.423	5	15.517	5	0.305	5	0.359
QH07PM1 7	5	1.703	5	1.639	5	8.283	5	14.495	5	0.257	5	0.205
QH14PM1 14	*	*	*	*	5	5.080	5	3.560	5	0.161	5	0.169
QH28PM1 28	5	1.210	5	1.883	5	4.023	5	18.938	5	0.166	5	0.137
QH56PM1 56	5	1.180	5	1.330	5	7.210	5	8.940	5	0.210	5	0.080
PHENOL 4.0% 23°C												
QL01PM1 1	5	2.408	5	2.774	5	7.578	5	28.413	5	0.415	5	0.474
QL07PM1 7	5	0.745	5	1.822	5	18.013	5	16.646	5	0.159	5	0.119
QL14PM1 14	*	*	*	*	5	11.410	5	8.170	5	0.170	5	0.068
QL28PM1 28	5	1.316	5	0.784	5	12.382	5	9.204	5	0.104	5	0.078
QL56PM1 56	5	3.220	5	0.982	5	16.540	5	10.480	5	0.089	5	0.159
SODIUM CHLORIDE 35.0% 50°C												
QH01SH1 1	5	1.546	5	1.439	5	29.047	5	16.169	5	0.172	5	0.240
QH07SH1 7	5	1.150	5	1.200	5	15.930	5	10.400	5	0.190	5	0.180
QH14SH1 14	5	1.649	5	1.256	5	15.213	5	7.145	5	0.250	5	0.199
QH28SH1 28	5	1.380	5	1.180	5	14.980	5	13.170	5	0.140	5	0.290
QH56SH1 56	5	2.503	5	1.043	5	14.685	5	13.569	5	0.187	5	0.303
SODIUM CHLORIDE 35.0% 23°C												
QL01SH1 1	5	1.339	5	1.522	5	14.803	5	12.437	5	0.381	5	0.161
QL07SH1 7	5	1.330	5	1.560	5	21.010	5	26.330	5	0.190	5	0.170
QL14SH1 14	5	1.875	5	1.847	5	17.768	5	19.490	5	0.305	5	0.207
QL28SH1 28	5	2.356	5	1.448	5	15.119	5	11.790	5	0.230	5	0.145
QL56SH1 56	5	1.355	5	2.092	5	11.893	5	23.096	5	0.276	5	0.305
SODIUM CHLORIDE 10.0% 50°C												
QH01SM1 1	5	1.804	5	1.320	5	28.116	5	36.617	5	0.242	5	0.311
QH07SM1 7	5	1.580	5	1.023	5	17.880	5	23.120	5	0.160	5	0.120
QH14SM1 14	5	3.146	5	1.845	5	6.453	5	8.953	5	0.409	5	0.318
QH28SM1 28	5	1.170	5	1.260	5	14.780	5	8.430	5	0.080	5	0.190
QH56SM1 56	5	0.659	5	1.194	5	7.833	5	6.233	5	0.092	5	0.159
SODIUM CHLORIDE 10.0% 23°C												
QL01SM1 1	5	1.785	5	1.170	5	12.097	5	11.410	5	0.076	5	0.129
QL07SM1 7	5	1.280	5	0.690	5	17.640	5	7.210	5	0.190	5	0.028
QL14SM1 14	5	1.813	5	5.077	5	24.282	5	56.481	5	0.180	5	0.161
QL28SM1 28	5	1.250	5	2.550	5	12.550	5	23.800	5	0.230	5	0.140
QL56SM1 56	5	1.405	5	1.461	5	18.309	5	12.349	5	0.107	5	0.099

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: STANDARD DEVIATIONS OF CHEMICAL IMMERSION RESULTS

		NUMBER BF M	STD DEV BF M	NUMBER BF T	STD DEV BF T	NUMBER EAB M	STD DEV EAB M	NUMBER EAB T	STD DEV EAB T	NUMBER TEAR M	STD DEV TEAR M	NUMBER TEAR T	STD DEV TEAR T
WATER 100.0% 50°C													
QH01WP1	1	5	1.007	5	1.383	5	11.972	5	31.926	5	0.258	5	0.322
QH07WP1	7	5	1.010	5	0.630	5	10.110	5	6.910	5	0.310	5	0.280
QH14WP1	14	5	1.344	5	1.138	5	3.596	5	9.899	5	0.423	5	0.454
QH28WP1	28	4	0.535	5	1.725	4	9.282	5	16.117	5	0.151	5	0.116
QH56WP1	56	5	1.244	5	1.308	5	4.982	5	5.130	5	0.222	5	0.060
WATER 100.0% 23°C													
QL01WP1	1	5	1.018	5	1.919	5	15.636	5	17.000	5	0.232	5	0.140
QL07WP1	7	5	1.303	5	1.656	5	21.055	5	8.046	5	0.188	5	0.111
QL14WP1	14	5	1.454	5	1.547	5	11.175	5	12.564	5	0.351	5	0.231
QL28WP1	28	5	2.173	5	1.002	5	12.309	5	11.282	5	0.166	5	0.178
QL56WP1	56	5	0.896	5	1.871	5	7.725	5	13.945	5	0.098	5	0.114
POTASSIUM DICHROMATE 10.0% 50°C													
QH01XM1	1	5	0.920	5	1.650	5	14.700	5	15.810	5	0.150	5	0.100
QH07XM1	7	5	2.981	5	1.966	5	16.285	5	11.414	5	0.085	5	0.158
QH14XM1	14	5	1.710	5	2.020	5	17.390	5	18.180	5	0.285	5	0.134
QH28XM1	28	5	0.820	5	0.920	5	10.700	5	9.600	5	0.180	5	0.210
QH56XM1	56	5	1.807	5	0.798	5	8.847	5	7.885	5	0.185	5	0.135
POTASSIUM DICHROMATE 10.0% 23°C													
QL01XM1	1	5	2.000	5	2.370	5	11.680	5	17.060	5	0.340	5	0.201
QL07XM1	7	5	1.230	5	0.730	5	18.570	5	11.750	5	0.200	5	0.080
QL14XM1	14	5	2.320	5	2.230	5	11.750	5	18.220	5	0.196	5	0.190
QL28XM1	28	5	3.310	5	1.370	5	23.300	5	17.150	5	0.150	5	0.280
QL56XM1	56	5	1.270	5	1.873	5	9.973	5	17.113	5	0.195	5	0.139

CSPE_LW : RETENTION OF PROPERTIES

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

		PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
HYDROCHLORIC ACID 10.0% 50°C												
QH01AM1	1	.3	1.0	.2	88	90	103	111	107	100	92	89
QH07AM1	7	1.4	2.6	1.3	86	88	109	119	114	105	92	91
QH14AM1	14	5.9	5.3	3.8	82	88	107	129	119	108	88	91
QH28AM1	28	6.4	9.2	8.5	82	81	116	130	113	108	83	84
QH99AM1	46	12.3	15.7	16.6	*	*	*	*	*	*	*	*
QH56AM1	56	11.6	13.9	14.7	67	63	114	135	117	115	67	72
QH99AM2	123	21.2	22.5	28.8	*	*	*	*	*	*	*	*
QH99AM3	242	21.1	24.5	31.8	42	*	100	*	131	*	*	*
HYDROCHLORIC ACID 10.0% 23°C												
QL01AM1	1	.3	.3	.3	99	102	106	112	93	92	102	100
QL07AM1	7	.4	*	.3	94	91	102	103	97	98	99	97
QL14AM1	14	4.2	*	.1	95	91	108	101	104	108	97	94
QL28AM1	28	.6	1.3	1.6	95	96	104	115	99	102	101	99
QL99AM1	46	.5	.7	1.0	*	*	*	*	*	*	*	*
QL56AM1	56	.7	1.0	1.1	88	87	104	112	102	102	94	96
QL99AM2	123	1.0	.7	.8	*	*	*	*	*	*	*	*
QL99AM3	241	2.4	2.6	3.2	82	*	88	*	111	*	*	*
SODIUM HYDROXIDE 10.0% 50°C												
QH01BM1	1	.3	2.2	.7	90	92	94	107	89	103	91	93
QH07BM1	7	1.0	5.3	3.3	82	83	91	99	98	99	89	89
QH14BM1	14	5.2	10.1	9.3	91	93	109	108	96	84	87	90
QH28BM1	28	10.1	11.2	12.7	91	96	111	106	88	70	77	83
QH99BM1	46	11.7	16.4	16.5	*	*	*	*	*	*	*	*
QH56BM1	56	11.6	14.4	16.2	102	107	130	125	87	69	79	80
QH99BM2	124	24.7	26.8	34.0	*	*	*	*	*	*	*	*
QH99BM3	242	27.5	28.2	38.8	83	*	130	*	75	*	*	*
SODIUM HYDROXIDE 10.0% 23°C												
QL01BM1	1	.4	.6	.6	92	83	96	98	87	110	93	98
QL07BM1	7	.5	1.0	1.3	89	87	92	97	97	104	90	91
QL14BM1	14	.6	1.4	1.5	92	89	104	107	102	99	94	90
QL28BM1	28	2.7	3.2	4.2	87	81	110	113	115	112	91	92
QL99BM1	46	11.7	14.9	17.9	*	*	*	*	*	*	*	*
QL56BM1	56	13.2	16.3	18.6	97	92	131	133	105	99	85	84
QL99BM2	124	15.0	27.0	32.5	*	*	*	*	*	*	*	*
QL99BM3	241	22.3	28.4	37.7	82	*	125	*	95	*	*	*
1 2 DICHLOROETHANE .8% 50°C												
QH01DH1	1	9.9	8.2	9.8	56	58	78	88	152	139	74	78
QH07DH1	7	10.3	9.3	9.8	54	54	79	89	148	141	72	77
QH14DH1	14	11.9	10.8	14.4	52	54	80	89	156	140	71	76
QH28DH1	28	14.5	14.8	16.8	44	47	78	85	165	140		
QH99DH1	46	9.0	14.1	11.7	*	*	*	*	*	*	*	*

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				1 2 DICHLOROETHANE .8% 50°C							
QH56DH1 56	10.5	12.5	12.7	73	74	98	110	119	106	81	89
QH99DH2 137	16.3	21.4	21.8	*	*	*	*	*	*	*	*
QH99DH3 242	21.6	26.5	30.4	54	*	98	*	95	*	*	*
				1 2 DICHLOROETHANE .8% 23°C							
QL01DH1 1	6.3	3.7	6.7	65	64	80	84	130	123	78	81
QL07DH1 7	6.4	4.2	7.6	67	74	81	84	127	101	80	80
QL14DH1 14	8.8	6.4	10.9	61	59	84	84	143	125	73	74
QL28DH1 28	7.0	4.7	6.8	73	74	89	101	114	121	80	84
QL99DH1 46	7.6	6.1	9.5	*	*	*	*	*	*	*	*
QL56DH1 56	8.0	6.5	9.7	68	67	88	96	131	107	72	77
QL99DH2 137	8.1	7.4	9.8	*	*	*	*	*	*	*	*
QL99DH3 241	9.4	8.7	12.1	65	*	87	*	130	*	*	*
				1 2 DICHLOROETHANE .1% 50°C							
QH01DL1 1	1.9	3.0	100.0	72	75	84	95	117	118	85	85
QH07DL1 7	3.5	4.0	4.2	69	70	83	93	122	111	88	88
QH14DL1 14	3.8	4.9	4.5	63	59	87	94	137	133	84	89
QH28DL1 28	5.2	6.3	6.3	71	71	98	106	129	118	81	87
QH99DL1 46	6.9	9.7	8.9	*	*	*	*	*	*	*	*
QH56DL1 56	7.0	8.9	9.1	71	70	100	110	121	108	81	81
QH99DL2 137	14.0	16.4	18.2	*	*	*	*	*	*	*	*
QH99DL3 242	20.1	22.4	29.0	57	*	109	*	92	*	*	*
				1 2 DICHLOROETHANE .1% 23°C							
QL01DL1 1	1.1	.3	*	75	75	81	90	106	116	85	83
QL07DL1 7	1.8	.3	1.2	81	78	89	97	117	118	89	92
QL14DL1 14	2.3	1.7	2.7	64	64	82	89	133	124	81	82
QL28DL1 28	2.7	2.2	3.0	74	74	89	97	117	117	87	89
QL99DL1 46	2.8	2.7	2.9	*	*	*	*	*	*	*	*
QL56DL1 56	3.1	2.7	3.6	76	71	95	99	122	123	93	97
QL99DL2 137	3.9	4.4	5.6	*	*	*	*	*	*	*	*
QL99DL3 241	3.8	5.4	6.2	74	*	95	*	115	*	*	*
				1 2 DICHLOROETHANE .5% 50°C							
QH01DM1 1	5.9	6.1	6.4	60	60	81	88	141	136	75	76
QH07DM1 7	6.1	5.4	6.4	63	58	81	89	138	133	74	85
QH14DM1 14	7.7	8.3	9.8	51	49	77	84	154	141	83	86
QH28DM1 28	8.0	9.1	9.7	73	74	97	108	128	115	77	82
QH99DM1 46	7.2	11.3	9.0	*	*	*	*	*	*	*	*
QH56DM1 56	7.6	11.2	9.9	74	76	101	110	121	106	80	87
QH99DM2 137	13.3	17.9	18.0	*	*	*	*	*	*	*	*
QH99DM3 242	21.3	24.5	29.8	56	*	113	*	101	*	*	*

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				1 2 DICHLOROETHANE .5% 23°C							
QL01DM1 1	4.8	2.7	5.0	74	71	83	88	116	119	81	84
QL07DM1 7	5.3	3.4	5.2	71	66	91	91	118	124	80	82
QL14DM1 14	5.7	2.7	5.0	68	63	84	90	124	126	80	78
QL28DM1 28	5.4	4.0	6.1	69	68	88	94	128	123	82	83
QL99DM1 46	4.1	2.6	4.0	*	*	*	*	*	*	*	*
QL56DM1 56	5.3	4.0	5.4	72	68	91	98	122	121	85	92
QL99DM2 137	5.0	4.6	5.9	*	*	*	*	*	*	*	*
QL99DM3 241	7.5	6.6	9.3	68	*	89	*	122	*	*	*
				FURFURAL 8.0% 50°C							
QH01FH1 1	9.3	7.5	9.8	63	60	92	102	135	131	74	75
QH07FH1 7	12.7	13.7	15.3	61	59	97	106	137	124	71	76
QH14FH1 14	14.1	14.1	17.9	59	57	96	102	136	125	68	73
QH28FH1 28	16.5	16.6	21.2	64	63	90	97	123	110	64	67
QH99FH1 46	27.1	25.9	34.7	*	*	*	*	*	*	*	*
QH56FH1 56	24.7	23.7	33.4	59	57	103	112	123	111	54	64
QH99FH2 137	35.1	35.7	50.6	*	*	*	*	*	*	*	*
QH99FH3 242	37.9	39.4	58.9	55	*	67	*	54	*	*	*
				FURFURAL 8.0% 23°C							
QL01FH1 1	7.2	4.7	8.4	75	71	96	104	120	116	83	85
QL07FH1 7	11.3	7.6	12.9	68	62	93	95	123	121	72	77
QL14FH1 14	9.9	10.8	11.5	77	77	98	112	111	117	85	86
QL28FH1 28	12.4	9.4	15.0	62	62	82	87	136	128	71	73
QL99FH1 46	12.5	8.8	14.8	*	*	*	*	*	*	*	*
QL56FH1 56	13.8	11.0	17.7	62	59	89	94	137	131	74	80
QL99FH2 137	13.4	10.8	17.0	*	*	*	*	*	*	*	*
QL99FH3 241	15.8	12.5	20.2	56	*	83	*	125	*	*	*
				FURFURAL 1.0% 50°C							
QH01FL1 1	1.7	2.5	1.7	84	83	104	120	113	114	90	95
QH07FL1 7	3.9	5.2	4.3	78	76	109	124	122	117	83	91
QH14FL1 14	3.6	4.8	4.5	76	74	104	117	116	112	81	85
QH28FL1 28	4.6	6.7	6.5	78	77	97	109	117	112	84	84
QH99FL1 46	6.5	9.5	8.8	*	*	*	*	*	*	*	*
QH56FL1 56	7.1	9.2	9.5	79	77	114	124	115	106	79	78
QH99FL2 137	13.5	16.0	18.6	*	*	*	*	*	*	*	*
QH99FL3 242	19.7	20.9	26.9	59	*	109	*	93	*	*	*
				FURFURAL 1.0% 23°C							
QL01FL1 1	1.0	1.0	1.3	97	97	112	122	103	102	100	103
QL07FL1 9	2.3	1.9	2.9	88	90	105	116	105	107	94	92
QL14FL1 14	2.0	2.0	2.8	88	81	104	113	103	110	92	95
QL28FL1 28	2.6	2.6	3.8	71	70	83	93	117	115	87	89

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
FURFURAL 1.0% 23°C											
QL99FL1 46	3.0	2.6	3.9	*	*	*	*	*	*	*	*
QL56FL1 56	3.3	2.5	4.3	74	68	97	103	125	122	83	89
QL99FL2 137	4.1	3.9	5.2	*	*	*	*	*	*	*	*
QL99FL3 241	4.5	4.9	6.7	74	*	98	*	125	*	*	*
FURFURAL 4.0% 50°C											
QH01FM1 1	4.4	4.7	5.0	68	68	94	105	131	120	78	81
QH07FM1 7	7.3	8.1	8.2	68	69	99	113	131	123	79	83
QH14FM1 14	7.0	8.0	9.0	69	67	103	110	127	115	75	80
QH28FM1 28	11.0	9.4	12.1	74	69	88	95	117	120	81	86
QH99FM1 46	12.3	14.4	15.8	*	*	*	*	*	*	*	*
QH56FM1 56	12.7	13.6	16.2	74	73	110	123	115	106	67	72
QH99FM2 137	23.4	24.2	31.9	*	*	*	*	*	*	*	*
QH99FM3 242	22.6	24.5	32.3	58	*	101	*	90	*	*	*
FURFURAL 4.0% 23°C											
QL01FM1 1	2.9	1.9	3.6	87	84	104	112	113	113	93	94
QL07FM1 7	5.0	3.3	5.0	75	73	97	106	119	116	81	88
QL14FM1 14	4.7	1.3	8.0	62	59	89	96	130	125	69	74
QL28FM1 28	2.9	2.9	4.2	73	71	99	107	121	111	76	80
QL99FM1 46	6.1	4.5	7.3	*	*	*	*	*	*	*	*
QL56FM1 56	6.7	5.9	9.4	78	74	102	108	118	118	83	87
QL99FM2 137	7.0	6.1	8.9	*	*	*	*	*	*	*	*
QL99FM3 241	8.3	7.4	11.2	70	*	93	*	121	*	*	*
METHYL ETHYL KETONE 26.0% 50°C											
QH01MH1 1	23.6	28.9	41.2	40	36	72	76	175	157	44	47
QH07MH1 7	35.8	35.5	50.1	33	31	67	72	173	151	42	53
QH14MH1 14	35.8	33.9	50.7	40	47	79	96	156	129	49	55
QH28MH1 28	33.3	2.5	10.2	36	37	73	85	170	144	48	48
QH99MH1 46	33.6	44.3	46.2	*	*	*	*	*	*	*	*
QH56MH1 56	38.5	39.7	61.7	34	32	75	80	147	124	34	39
QH99MH2 137	52.9	55.1	42.8	*	*	*	*	*	*	*	*
QH99MH3 242	37.5	42.3	35.0	33	*	30	*	69	*	*	*
METHYL ETHYL KETONE 26.0% 23°C											
QL01MH1 1	15.5	11.7	21.8	57	56	79	81	138	127	57	65
QL07MH1 7	16.1	12.7	22.1	52	56	76	81	146	131	62	64
QL14MH1 14	16.9	13.8	22.4	61	62	92	100	131	119	62	65
QL28MH1 28	17.4	14.3	24.1	53	50	76	81	145	139	64	68
QL99MH1 46	18.1	15.4	24.5	*	*	*	*	*	*	*	*
QL56MH1 56	17.4	17.0	30.5	44	41	75	78	152	141	52	53
QL99MH2 137	18.9	16.3	25.4	*	*	*	*	*	*	*	*
QL99MH3 241	19.5	16.7	66.1	44	*	89	*	136	*	*	*

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
METHYL ETHYL KETONE 3.0% 50°C											
QH01ML1 1	2.9	4.8	4.6	67	68	79	86	118	119	80	81
QH07ML1 7	5.0	6.7	6.9	67	69	95	104	129	124	82	82
QH14ML1 14	5.6	7.2	7.9	72	71	100	114	124	118	82	87
QH28ML1 28	6.2	7.9	8.6	65	67	88	100	133	122	78	83
QH99ML1 46	9.2	13.4	12.4	*	*	*	*	*	*	*	*
QH56ML1 56	9.3	13.2	15.6	74	66	111	109	116	109	69	73
QH99ML2 137	19.6	22.5	26.4	*	*	*	*	*	*	*	*
QH99ML3 242	20.1	24.4	29.3	55	*	101	*	87	*	*	*
METHYL ETHYL KETONE 3.0% 23°C											
QL01ML1 1	1.1	.6	1.0	72	73	79	83	108	108	79	85
QL07ML1 7	2.6	2.1	3.7	77	73	84	89	107	113	85	84
QL14ML1 14	2.9	1.6	3.2	80	79	104	111	118	113	86	90
QL28ML1 28	3.2	2.9	4.6	71	67	84	87	124	124	87	85
QL99ML1 46	3.7	3.0	4.8	*	*	*	*	*	*	*	*
QL56ML1 56	3.9	3.9	5.8	73	67	99	101	130	123	83	84
QL99ML2 137	4.6	4.0	5.5	*	*	*	*	*	*	*	*
QL99ML3 241	5.1	5.0	6.8	71	*	95	*	131	*	*	*
METHYL ETHYL KETONE 13.0% 50°C											
QH01MM1 1	11.6	15.8	19.1	50	50	77	87	158	147	52	62
QH07MM1 7	20.2	22.9	26.9	46	47	80	93	158	137	63	64
QH14MM1 14	21.8	23.5	32.5	56	58	99	104	144	119	65	73
QH28MM1 28	22.5	24.6	33.9	52	51	88	98	147	127	63	68
QH99MM1 46	28.7	34.6	42.2	*	*	*	*	*	*	*	*
QH56MM1 56	26.7	31.3	42.1	42	39	89	95	146	125	47	53
QH99MM2 137	28.0	35.0	37.9	*	*	*	*	*	*	*	*
QH99MM3 242	27.4	35.9	40.4	43	*	71	*	86	*	*	*
METHYL ETHYL KETONE 13.0% 23°C											
QL01MM1 1	6.7	5.1	9.5	67	68	82	82	126	118	75	80
QL07MM1 7	8.8	6.4	11.5	56	54	72	76	140	135	69	69
QL14MM1 14	9.1	7.8	13.1	77	79	102	114	116	113	79	84
QL28MM1 28	9.6	6.2	19.1	61	57	80	82	136	128	74	73
QL99MM1 46	9.4	9.1	13.5	*	*	*	*	*	*	*	*
QL56MM1 56	9.6	8.8	15.2	56	53	85	88	143	131	66	66
QL99MM2 137	10.2	11.4	14.8	*	*	*	*	*	*	*	*
QL99MM3 240	11.6	12.3	14.7	61	*	93	*	140	*	*	*
ASTM #2 OIL SATURATED 50°C											
QH01OM1 1	2.0	3.2	3.1	82	80	92	103	107	111	89	89
QH07OM1 7	12.1	11.5	14.8	67	63	89	101	130	130	x????F	

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				ASTM #2 OIL SATURATED 50^oC							
QH990M1 46	7.1	9.6	9.2	*	*	*	*	*	*	*	*
QH560M1 56	9.8	10.4	12.0	75	73	115	129	118	107	73	78
QH990M2 133	16.9	18.2	23.8	*	*	*	*	*	*	*	*
QH990M3 242	27.7	24.8	36.8	57	*	112	*	88	*	*	*
				ASTM #2 OIL SATURATED 23^oC							
QL010M1 1	.6	1.0	1.1	87	87	94	103	98	104	96	96
QL070M1 7	1.2	1.6	1.9	82	81	90	94	115	114	90	89
QL140M1 14	1.5	1.3	2.0	82	80	97	106	108	106	88	96
QL280M1 28	2.3	1.6	2.6	86	83	101	112	103	110	91	92
QL990M1 46	2.2	2.0	2.8	*	*	*	*	*	*	*	*
QL560M1 56	3.2	3.0	4.4	83	78	104	115	109	112	89	89
QL990M2 106	4.7	5.3	7.5	*	*	*	*	*	*	*	*
QL990M3 241	6.7	5.6	9.4	72	*	88	*	129	*	*	*
				ASTM #2 OIL 100.0% 50^oC							
QH010P1 1	16.4	19.4	24.0	63	57	80	89	122	125	65	70
QH070P1 7	48.4	38.0	66.7	27	21	67	77	173	177	37	50
QH140P1 14	71.6	52.7	98.3	16	26	56	62	188	155	27	40
QH280P1 28	84.1	2.9	34.3	13	24	50	62	181	146	23	31
QH990P1 46	103.0	83.2	134.1	*	*	*	*	*	*	*	*
QH560P1 56	85.5	67.6	124.0	16	24	55	69	160	143	21	25
QH990P2 128	103.3	97.0	150.4	*	*	*	*	*	*	*	*
QH990P3 242	96.8	96.4	148.2	7	*	52	*	111	*	*	*
				ASTM #2 OIL 100.0% 23^oC							
QL010P1 1	.7	1.0	1.1	92	92	94	100	95	104	93	91
QL070P1 7	1.4	1.0	100.0	92	91	102	106	107	103	89	93
QL140P1 14	2.8	2.7	3.9	92	90	100	103	96	96	85	91
QL280P1 28	4.7	4.5	7.1	85	87	101	111	110	106	87	79
QL990P1 46	5.8	4.6	8.3	*	*	*	*	*	*	*	*
QL560P1 56	7.0	5.0	9.4	81	78	98	106	109	105	82	80
QL990P2 128	9.8	6.9	14.4	*	*	*	*	*	*	*	*
QL990P3 241	13.3	10.6	20.9	71	*	95	*	111	*	*	*
				PHENOL 8.0% 50^oC							
QH01PH1 1	14.7	13.0	18.4	55	55	97	109	149	137	65	76
QH07PH1 7	16.4	16.9	22.7	55	49	101	109	154	143	67	71
QH14PH1 14	16.9	17.9	23.9	32	21	77	89	145	142	60	67
QH28PH1 28	22.8	22.7	75.0	46	42	99	108	154	139	55	59
QH99PH1 46	29.2	27.8	39.3	*	*	*	*	*	*	*	*
QH56PH1 56	28.5	23.8	37.1	46	41	95	107	143	131	48	55
QH99PH2 137	38.9	35.0	53.7	*	*	*	*	*	*	*	*
QH99PH3 242	44.0	38.8	62.7	33	*	67	*	107	*	*	*

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				PHENOL 8.0% 23°C							
QL01PH1 1	6.7	4.9	7.8	76	69	86	93	106	128	81	84
QL07PH1 7	10.7	8.4	13.8	59	57	88	94	144	139	73	75
QL14PH1 14	9.0	9.3	13.8	*	*	*	*	134	141	77	74
QL28PH1 28	9.5	7.2	11.8	61	57	96	103	144	138	69	73
QL99PH1 46	10.9	7.2	12.8	*	*	*	*	*	*	*	*
QL56PH1 56	9.8	7.9	12.9	60	53	80	92	148	143	73	74
QL99PH2 137	11.5	7.8	13.2	*	*	*	*	*	*	*	*
QL99PH3 241	12.6	8.8	14.8	53	*	82	*	149	*	*	*
				PHENOL 1.0% 50°C							
QH01PL1 1	1.9	2.6	2.3	82	71	107	93	110	118	85	91
QH07PL1 7	2.5	3.9	2.9	84	83	112	129	118	114	89	100
QH14PL1 14	1.8	4.7	4.1	59	49	90	102	125	116	84	90
QH28PL1 28	4.0	6.1	5.3	81	78	118	125	122	111	79	84
QH99PL1 46	6.0	8.2	7.2	*	*	*	*	*	*	*	*
QH56PL1 56	5.0	6.4	6.4	66	67	92	106	125	113	72	74
QH99PL2 137	15.9	17.0	20.3	*	*	*	*	*	*	*	*
QH99PL3 242	23.5	24.3	32.6	54	*	116	*	94	*	*	*
				PHENOL 1.0% 23°C							
QL01PL1 1	.9	.7	1.3	94	90	109	103	91	101	95	96
QL07PL1 7	1.8	1.4	2.3	91	89	109	118	111	108	99	101
QL14PL1 14	1.9	1.7	2.4	83	79	90	100	118	122	90	95
QL28PL1 28	2.0	.3	.9	86	83	107	113	115	110	89	91
QL99PL1 46	2.0	1.6	2.5	*	*	*	*	*	*	*	*
QL56PL1 56	2.2	2.1	3.0	83	76	109	102	114	120	84	88
QL99PL2 137	2.4	1.9	2.6	*	*	*	*	*	*	*	*
QL99PL3 241	2.4	2.3	2.9	75	*	96	*	125	*	*	*
				PHENOL 4.0% 50°C							
QH01PM1 1	6.1	5.4	6.7	63	65	81	108	126	130	78	80
QH07PM1 7	6.8	7.5	8.3	66	64	104	115	139	127	77	79
QH14PM1 14	7.3	8.3	8.9	*	*	*	*	137	131	74	77
QH28PM1 28	9.8	10.8	11.8	63	58	109	114	138	120	64	70
QH99PM1 46	12.8	14.6	16.3	*	*	*	*	*	*	*	*
QH56PM1 56	11.9	12.4	15.6	62	56	108	108	133	129	65	72
QH99PM2 137	33.0	31.2	45.2	*	*	*	*	*	*	*	*
QH99PM3 242	39.5	37.3	57.0	40	*	85	*	95	*	*	*
				PHENOL 4.0% 23°C							
QL01PM1 1	2.9	2.3	3.3	81	86	98	109	107	98	93	88
QL07PM1 7	6.0	3.7	7.0	72	69	95	100	131	123	83	82
QL14PM1 14	5.7	3.7	6.6	*	*	*	*	137	130	77	80
QL28PM1 28	6.4	5.5	8.5	73	66	105	109	132	124	77	79

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
PHENOL 4.0% 23°C											
QL99PM1 46	6.4	4.5	7.2	*	*	*	*	*	*	*	*
QL56PM1 56	6.6	4.1	6.5	63	63	94	109	130	125	73	73
QL99PM2 137	7.0	5.1	8.1	*	*	*	*	*	*	*	*
QL99PM3 241	7.3	5.8	8.6	60	*	81	*	142	*	*	*
SODIUM CHLORIDE 35.0% 50°C											
QH01SH1 1	.3	2.0	.8	87	85	93	102	92	107	90	91
QH07SH1 7	.3	3.2	1.0	87	92	91	98	99	103	95	96
QH14SH1 14	.4	1.9	.6	91	91	103	114	102	103	96	94
QH28SH1 28	.4	3.0	.9	86	86	93	99	99	103	91	89
QH99SH1 46	.6	3.3	.9	*	*	*	*	*	*	*	*
QH56SH1 56	.6	3.0	2.0	90	94	107	115	100	90	88	97
QH99SH2 131	.6	4.3	1.6	*	*	*	*	*	*	*	*
QH99SH3 242	.2	4.7	2.1	94	*	107	*	102	*	*	*
SODIUM CHLORIDE 35.0% 23°C											
QL01SH1 1	.2	.7	.7	85	83	86	94	86	106	96	99
QL07SH1 7	.2	.6	1.0	94	91	94	93	98	98	96	95
QL14SH1 14	.3	1.0	1.2	90	91	95	103	93	103	99	99
QL28SH1 28	.4	.6	.9	91	88	98	107	94	103	93	94
QL99SH1 46	.3	.3	.4	*	*	*	*	*	*	*	*
QL56SH1 56	.4	.7	.9	89	89	103	105	99	92	97	93
QL99SH2 131	.4	.7	.5	*	*	*	*	*	*	*	*
QL99SH3 241	.3	1.7	1.7	87	*	86	*	106	*	*	*
SODIUM CHLORIDE 10.0% 50°C											
QH01SM1 1	.4	1.8	.5	83	82	87	94	93	100	83	91
QH07SM1 7	.4	3.2	1.2	83	82	91	101	109	110	93	92
QH14SM1 14	.5	1.9	.1	80	86	98	113	112	107	93	91
QH28SM1 28	.6	3.4	1.8	78	75	90	98	113	110	84	82
QH99SM1 46	.6	2.9	.6	*	*	*	*	*	*	*	*
QH56SM1 56	.7	2.4	1.1	84	87	103	117	108	101	88	88
QH99SM2 124	.3	2.9	.3	*	*	*	*	*	*	*	*
QH99SM3 242	.1	3.6	.9	92	*	110	*	95	*	*	*
SODIUM CHLORIDE 10.0% 23°C											
QL01SM1 1	.3	.7	.7	84	79	89	93	103	107	92	92
QL07SM1 7	.4	1.0	1.3	89	87	90	97	98	107	94	93
QL14SM1 14	.5	.3	.2	92	88	101	103	100	95	95	94
QL28SM1 28	.5	1.0	1.3	86	87	99	106	104	100	91	91
QL99SM1 46	.7	.3	.1	*	*	*	*	*	*	*	*
QL56SM1 56	.6	1.6	2.2	89	88	105	115	105	105	92	94
QL99SM2 124	.6	.3	.4	*	*	*	*	*	*	*	*
QL99SM3 241	.8	.3	.2	85	*	97	*	120	*	*	*

CHLOROSULFONATED POLYETHYLENE LOW WATER ABSORPTION: CHEMICAL IMMERSION RESULTS, RETENTION OF PROPERTIES

	PERCENT WEIGHT CHANGE	PERCENT THICKNESS CHANGE	PERCENT THICKNESS CHANGE	PERCENT RETENTION SMOD M	PERCENT RETENTION SMOD T	PERCENT RETENTION BF M	PERCENT RETENTION BF T	PERCENT RETENTION EAB M	PERCENT RETENTION EAB T	PERCENT RETENTION TEAR M	PERCENT RETENTION TEAR T
				WATER 100.0% 50°C							
QH01WP1 1	1.0	2.9	1.4	93	91	100	108	88	100	92	95
QH07WP1 7	2.3	4.4	2.9	74	73	92	101	123	116	85	89
QH14WP1 14	3.2	5.1	4.5	69	72	96	112	121	115	82	83
QH28WP1 28	4.4	6.3	5.8	74	74	101	110	127	116	86	88
QH99WP1 46	6.7	8.5	8.2	*	*	*	*	*	*	*	*
QH56WP1 56	6.0	7.7	7.5	74	71	114	126	120	109	77	79
QH99WP2 122	13.3	13.3	15.7	*	*	*	*	*	*	*	*
QH99WP3 242	20.3	21.2	28.1	60	*	110	*	87	*	*	*
				WATER 100.0% 23°C							
QL01WP1 1	.4	.3	.3	82	84	90	98	106	101	93	92
QL07WP1 7	1.0	1.0	1.3	93	94	98	106	93	102	98	100
QL14WP1 14	1.3	2.0	2.5	90	90	102	111	101	103	94	95
QL28WP1 28	1.8	1.9	2.3	84	79	98	106	107	110	86	91
QL99WP1 46	2.3	1.3	2.3	*	*	*	*	*	*	*	*
QL56WP1 56	2.1	1.9	2.5	86	80	106	117	108	108	94	96
QL99WP2 122	2.9	1.6	2.8	*	*	*	*	*	*	*	*
QL99WP3 241	3.7	3.2	4.2	80	*	87	*	112	*	*	*
				POTASSIUM DICHROMATE 10.0% 50°C							
QH01XM1 1	.5	1.6	1.1	87	87	104	115	109	103	89	95
QH07XM1 7	.9	2.8	1.4	80	81	96	111	109	107	88	90
QH14XM1 14	.8	2.9	1.4	80	81	99	116	104	107	89	89
QH28XM1 28	1.0	3.4	1.4	68	68	85	95	121	117	81	84
QH99XM1 46	.9	3.6	.9	*	*	*	*	*	*	*	*
QH56XM1 56	1.2	3.1	1.5	80	83	109	122	113	105	83	86
QH99XM2 132	1.1	3.9	1.2	*	*	*	*	*	*	*	*
QH99XM3 242	1.2	4.2	1.5	83	*	111	*	106	*	*	*
				POTASSIUM DICHROMATE 10.0% 23°C							
QL01XM1 1	.5	.6	.9	98	96	107	111	95	97	97	97
QL07XM1 7	.7	*	.7	89	89	100	108	97	103	93	96
QL14XM1 14	.8	.7	1.3	86	89	103	112	103	99	93	95
QL28XM1 28	1.2	1.6	2.1	89	88	98	106	98	104	91	95
QL99XM1 46	1.2	1.6	1.8	*	*	*	*	*	*	*	*
QL56XM1 56	1.5	1.8	2.5	88	84	106	116	109	105	93	91
QL99XM2 132	1.3	1.6	1.7	*	*	*	*	*	*	*	*
QL99XM3 241	1.3	2.3	2.1	81	*	83	*	110	*	*	*